The Minimal-Interactivity Effect:

The Role of Thought Speed in the Consumption of Digital Experiences

by

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ABSTRACT

In this dissertation, I study the power of *minimal interactivity*—defined as a single simple action that exercises control during a consumption experience—to affect evaluations and media consumption decisions. I argue that, in contrast to passivity, even when consumers navigate online at low levels of interactivity—for example, simply clicking from one Instagram image, Tweet or Facebook post to the next, it can positively influence the experience. This work builds upon and also diverges from prior work that examines interactivity as a complex system and process (Ariely 2000; McMillan and Hwang 2002; Schlosser 2003; Wu 2005) by investigating simple actions as a form of interactivity. To explain the minimal interactivity effect, I introduce the concept of thought speed into the marketing literature and illustrate how it affects consumer behaviour. Specifically, I find in a series of studies that minimal interactivity accelerates thought speed, which in turn enhances consumers' evaluations of the digital experience and, ultimately, increases media consumption. Together, these findings suggest that in contrast to passive consumption, even minimal interactivity enhances the experience.

PREFACE

This thesis is an original work by Shuo Chen. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “Consumer Experience Immersion and Judgment and Decision Making”, No. Pro00059918, October 21, 2015. No part of this thesis has been previously published.

DEDICATION

To family, friends, and the mentors that have guided me.

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INTRODUCTION

Advances in technology have dramatically affected media consumption. Passive media consumption (e.g. television), which grew to dominate the marketing landscape post-WWII, is being challenged and, in many cases, replaced by interactive digital experiences (e.g. Instagram, Snapchat, YouTube, etc.). Among adults in the United States, 2018 was the first year that the time spent with digital media (i.e., online text, audio and video, including social networks) surpassed the time spent with traditional media (i.e., print, radio and television). On average, consumers use digital media for 6.32 hours per day, which is 52% of the total time spent on media consumption (eMarketer 2018a). This shift creates an opportunity for marketers, as expenditures follow the migration of consumer attention. Globally, digital advertising accounts for 44% of overall ad spending (McNair 2018). In the U.S., marketing dollars allocated to mobile advertising recently surpassed TV ad expenditures (eMarketer 2018b). Even when Americans watch television, 81% simultaneously interact with a second screen—such as a phone or a tablet (IAB 2017; Kats 2018). Without a doubt, interactive digital media has become a ubiquitous part of the modern consumer experience.

In this dissertation, I examine a meaningful, but subtle, distinction between passive and interactive viewing experiences. In particular, I am interested in how even minimal levels of interactivity, such as when we interact with the content by controlling the progression of the experience, affects consumer preference. Digital media allows users to decide when to pause and proceed with content viewing, whereas consumers of traditional media are generally limited to a pre-set program—content progresses without the user's interference. This subtle distinction is also commonplace across digital platforms. For instance, Facebook and Twitter auto-play some content, but give the users the option to click "play" at other times.

To understand this distinction between passive and interactive consumption, I draw upon extant literature in interactivity that examines interactivity as a complex system and process (Ariely 2000; McMillan and Hwang 2002; Schlosser 2003; Wu 2005). These prior work approach interactivity by conceptualizing it as a series of actions taken by the user to interact with an interface. For example, re-organizing multiple pieces of information (Ariely 2000), manipulating images on a website (Schlosser 2003), or introducing multiple interactive elements on a website including online chat-room and searchable pull-down menus (Wu 2005). In this dissertation, I build upon and diverge from this work by investigating the effect that even minimal levels of interactivity—as little as a click of a mouse—can have on the evaluation of and preference for media consumption.

There is, of course, a wide variety of factors that affect the evaluation of hedonic consumption experiences (Alba and Williams 2012). These include the design of a product (Jordan 2000; Norman 2004), how the product or experience is positioned (Noseworthy and Trudel 2011; Stayman, Alden and Smith 1992), personality traits (Block, Brunel and Arnold 2003; Haws and Poynor 2008), achievement (Murray and Bellman 2011), affective state (Andrade 2005; Mano and Oliver 1993; Pham et al. 2001), engagement (Higgins 2006) and flow (Csikszentmihalyi 1997). Among such factors, minimal interactivity during a digital hedonic experience is important to consider because consumers often interact with content at low levels of interactivity. For example, consumers navigate a series of images and headlines on news websites or social media feeds as one merely clicks from one Instagram image, Tweet or Facebook post to the next. As prior work suggests, even simple design decisions can have notable implications on how consumers perceive, navigate and consume an experience (Patrick 2016). As such, minimal interactivity (as in the form of clicking) is worthy of study because the experience of interactivity not only comes from complex designs, but subtle interface changes may alter how consumers respond to the same content, thereby transforming the experience altogether (Brasel and Gips 2014; Rokeby 1998).

With this focus on minimal interactivity, I explain that a simple action can create an advantage over passive offerings and provide insight into the psychological mechanism that underlies this consumer preference. In this dissertation, I define minimal interactivity as *a single simple action that exercises control during a consumption experience* (e.g. Ariely 2000; Lombard and Snyder-Duch 2001; Schlosser 2003). Moreover, I differentiate it from 1) actions that require the same motor skills but lack control over the experience (Hsee, Yang and Wang 2010), 2) a general sense of control that does not require performing the same simple action during the experience (Landau, Kay and Whitson 2015), and 3) complex actions such as reorganizing information or manipulating objects on a website (Ariely 2000; Schlosser 2003). The results (discussed in Chapter 2) show that even minimally interactive media consumption experiences are evaluated more favorably than passive experiences, which leads to a higher likelihood of consuming similar experiences in the future.

Prior work has explained the link between interactivity and consumer behaviour in terms of creating highly engaging experiences (Mollen and Wilson 2010) that activate flow (Novak, Hoffman and Duhachek 2003; Van Noort, Voorveld and Van Reijmersdal 2012). I argue that these mechanisms are adequate for explaining complex forms of interactivity, but they may not be sufficient to explain what happens at minimal levels of interactivity, such as when consumers click “next” to continue.

To explain the effect of minimal interactivity on the consumption of a digital experience, I introduce into the marketing literature the concept of thought speed—defined as the number of thoughts per unit of time (Pronin, Jacobs and Wegner 2008; Yang and Pronin 2018). The basic premise, which I elaborate on in Chapter 1, is that additional thought is required when a consumer exercises control over their media consumption, deciding when to proceed to the next image or news headline, as compared to passively consuming the same content. Because more thoughts are occurring in the same period of time, thought speed is faster during interactive (vs. passive) consumption. This is not the same as simply having more thoughts. Instead, this process is analogous to a car traveling a longer distance in the same period of time, which also requires greater speed. Faster thought speed means more thoughts within a period of time, the same way that driving faster means covering more distance in the same period of time. I argue that accelerated thought speed has a positive effect on evaluations because it makes the experience more enjoyable and consumers feel that they made better use of the time they spent on media consumption. This is consistent with prior research reporting that the combination of enhanced enjoyment and productive use of time are critical determinants of consumers' evaluations and their consumption of digital hedonic experiences (Bellman and Murray 2018; Murray and Bellman 2011).

In the chapters that follow, I introduce the research model and elaborate on the theoretical background that motivates my predictions (Chapter 1). I then test those predictions in a series of experiments, and then cast doubt on other potential mechanisms (Chapter 2). I draw conclusions in the last chapter (Chapter 3), summarize the contributions of this work and discuss its implications.

Table 1. Overview of Experiments and Key Hypotheses

Study	Context	Participants	Key Variables	Hypotheses
1A	Image Viewing	191 Undergraduates	IV: Interactivity Mediator: Thought Speed DV: Evaluation	H1a, H2,H5
1B	Reading	189 MTurkers	IV: Interactivity Mediator: Thought Speed DV: Evaluation	H1a, H2,H5
2	Image Viewing	399 MTurkers	IV: Interactivity Moderator: Valence Mediator: Thought Speed DV: Evaluation	H1a, H2,H5,H7
3	Image Viewing	125 Undergraduates	IV: Interactivity Moderator: Cognitive Load Mediator: Thought Speed DV1: Evaluation DV2: Consumption Intention	H1a&b, H2, H3,H5,H6
4	Reading	173 MTurkers	IV: Interactivity Moderator: Arousal Mediator: Thought Speed DV1: Evaluation DV2: Consumption Intention	H1a&b, H2, H4,H5,H6
5	Image Viewing	390 MTurkers	IV: Interactivity DV: Consumption	H1b
6	Image Viewing	284 MTurkers	IV: Interactivity Mediator: Thought Speed DV1: Evaluation DV2: Consumption Intention	H1a&b, H2,H5,H6
7A	Image Viewing	201 Undergraduates	IVs: Interactivity, Control DV1: Evaluation DV2: Consumption Intention	H1a&b
7B	Image Viewing	238 Undergraduates	IVs: Interactivity, Control DV: Consumption Intention	H1b

CHAPTER 1: THEORETICAL BACKGROUND

Conceptualizing Interactivity

At a general level, interactivity is a multidimensional construct that reflects “the extent to which users can participate in modifying the form or content of a mediated environment in real-time” (Steur 1992). It is a key part of the digital experience and plays a pivotal role in how we navigate computer-mediated environments (Hoffman and Novak 1996; Novak, Hoffman and Yung 2000; Schneiderman 1987). However, there is little agreement on a specific conceptual or operational definition. Some work suggests that interactivity has three distinct dimensions: control, responsiveness and communication (Song and Zinkhan 2008). Other researchers use interactivity as an umbrella concept that covers a different variables and constructs including choice, control, manipulation, navigation and/or the modification of form, content, messages, structure and pace (Ariely 2000; Kiousis 2002; Ko, Cho and Roberts 2005; Lombard and Snyder-Duch 2001; McMillan and Hwang 2002; Spielmann and Mantonakis 2018). For example, researchers have conceptualized and operationalized interactivity in a variety of different ways, ranging from online website support (McMillan and Hwang 2002) to rotating and manipulating content (Schlosser 2003) to controlling the flow of information on an e-commerce website (Jiang, Chan, Tan and Chua 2010).

Specifically, Song and Zinkhan (2008) find that prior work has focused on manipulating interactivity by “varying the number of available features” on the website. Under this conceptualization, a website with more features (such as the inclusion of search functions or chat-rooms) would be perceived as being more interactive. However, the authors also argue that changing the mere perception of interactivity depends on consumers’ utilization of these features. In other words, consumers will only view the site as interactive when they have had an interaction with such features. Therefore, I focus on an experience and a specific aspect of interactivity that all consumers have experience with — having control to advance. I focus on this minimal form of interactivity and define minimal interactivity as the simple action of exercising control during a digital consumption experience. This conceptualization is consistent with prior research that defined interactivity as a form of control (Ariely 2000; Lombard and Snyder-Duch 2001; Schlosser 2003).

It is important to note that conceptualizing interactivity as a form of control differs from a general sense of control. The sense of control — whether individuals believe that desired outcomes can be intentionally produced, while undesirable ones actively prevented —is a fundamental need for us to maintain (Skinner, Chapman, and Baltes 1988; Landau, Kay and Whitson 2015; Lefcourt 1973; White 1959). This feeling of being capable of achieving goals allows individuals to navigate daily tasks without worrying about whether the environment is entirely uncertain (Tullett, Kay and Inzlicht 2015). Specifically, prior work shows that having personal control is a baseline state—people tend to maintain a perception of high personal control, even when control is absent (Alloy and Abramson 1979; Langer 1975). In this current work, I contend that a sense of control alone is insufficient to create a positive digital experience. Thus, I contrast the effects a simple action that exercises control, and a general sense of control have on a consumption experience in two experiments in Chapter 2.

Early work on computer-mediated environments treats digital interactions as a way for consumers to seek information (Häubl and Murray 2003). While prior interactivity literature focuses on understanding its effect on product searches, I shift away from this information-processing focus to instead examine how interactivity influences digital media consumption experiences. This reflects the fact that although the digital world is an unparalleled source of information (Ferguson and Perse 2000), it has also become an equally important source of entertainment (Amiel and Sargent 2004). According to Amiel and Sargent (2004), while e-mails and search engines were reported as being the most frequently used services, participants also reported entertainment (such as using music-sharing programs and chatting online) as a top reason for why they interact with the digital world.

The study of how minimal interactivity influences a digital experience reflects the recognition that small changes can impact consumption and decision making in a big way (Thaler and Sunstein 2009). For example, merely being exposed to a stimulus more times can influence subsequent evaluations (Zajonc 1968), and a simple physical touch can induce feelings of greater ownership towards a physical object (Peck and Shu 2009). Extending prior findings on psychological ownership, recent work further suggests that introducing touch via touchscreens (such as shopping on an iPad) could increase willingness to pay and endowment in the online environment, even when consumers do not interact with the physical product (Brasel and Gips 2014). Specifically, participants were randomly assigned to use a mouse, a touchpad, or a touchscreen to interact with products that differed in their haptic importance (sweatshirt vs. a city tour). The authors found that participants had greater psychological ownership when using the touchscreen (vs. the mouse or the touchpad), and this greater psychological ownership subsequently increased willingness to pay and endowment effects. In the domain of digital consumption, minor changes in the interface, such as whether an interaction is with an anthropomorphized (vs. non-anthropomorphized) helper, can significantly influence how players enjoy a game (Kim, Chen and Zhang 2016), for example. Indeed, small design changes in the interface can have substantial impact on the digital experience. Therefore, I diverge from prior work in interactivity, and focus on the effect of simple actions by studying the impact of minimal interactivity—such as clicking to navigate from one image or headline to the next—on evaluation and consumption.

In the current context of digital consumption, minimal interactivity is commonplace on news websites and social media platforms (e.g. Instagram, Snapchat, Twitter, Facebook, etc.). For example, consumers are interacting with media content when they click through an Instagram story, but they are viewing passively when they allow that Instagram story to play automatically in a slideshow manner. On news websites and media platforms like Facebook and Twitter, consumers can click to interact with the content, or they can watch that content automatically play, which creates a passive viewing experience.

Disadvantages of Interactivity

Despite the prevalence of minimal interactivity in digital experiences, there are reasons to believe that exercising control over an experience could have unintended negative consequences. First, prior work studying hedonic adaptation suggests that when consumers choose the rate of consumption, having control over a consumption episode can inadvertently decrease enjoyment (Galak, Kruger and Loewenstein 2013). In a series of studies, Galak et al. examined the extent to which letting participants consume at their own pace versus a pre-set pace influences how much pleasure they derived from that experience. Across consumption domains (chocolate eating and game playing), the authors found that compared to those whose consumption pace was set to a pre-determined, constrained schedule, participants who chose their own consumption pace enjoyed the experience less.

Second, an interactive experience often requires additional cognitive effort, and this effort could detract from the evaluation of the experience. Work in psychology and marketing has long established that consumers have limited cognitive resources. As such, we act as cognitive misers and try to limit expenditure of effort (Bettman, Johnson and Payne 1990). Thus, a digital experience that requires interaction could demand effort from consumers that they do not want to expend. Indeed, research has demonstrated that having control requires additional cognitive effort (Ariely 2000). Further, extant research in hedonic consumption has shown that individuals often evaluate an experience more positively when they are able to direct attention to the core experience (Diehl, Zauberman and Barasch 2016), and they would be distracted from this focus if they had to direct cognitive resources elsewhere (e.g. to interact with the content). Therefore, even if consumers are willing to expend cognitive effort while participating in hedonic consumption, this could lead to a less positive experience.

Advantages of Interactivity and Its Impact on Consumption Experience

In contrast to prior work, which suggests that having control over a hedonic experience can have unintended negative effects (Galak et al. 2013) and create an unwanted cognitive burden that distracts consumers from the experience (Ariely 2000), I argue that *minimal interactivity has a positive effect on the evaluation of hedonic experiences*. To do so, I draw upon work examining the mere-reaction effect (Hsee, Yang and Ruan 2015), as well as prior literature on interactivity in the context of website effectiveness.

At a broad level, interactivity, even in a minimal form, triggers a reaction from the target when an action is taken. For example, search results emerge when queries are entered, and images on Instagram appear when users scroll down the page. In both cases, the consumer performed an action that prompted a reaction from the interface. Although prior work in psychology suggests that a reaction is reinforcing only when it is positive or useful (Skinner 1953), recent work suggests that even non-valenced response, such as the sound of a coin dropping, can be reinforcing and evaluated positively. Specifically, Hsee et al. (2015) find that people like behaviours that generate reactions. In that study, the authors examined several behaviours that ranged from throwing beans to entering passwords and found that people like experiences more when their behaviour generates a reaction (i.e., when throwing beans made a sound or entering a password resulted in a circle flashing on the screen).

Notably, the authors found that when typing a text message resulted in an image being displayed on the screen, people sent more messages (as compared to a control condition wherein there was no image displayed). Arguably, because minimal interactivity is a single simple action that exercises control over a consumption experience, a response is triggered after the consumer takes that action. Thus, a minimally interactive experience should be evaluated more positively than a passive experience.

Additional evidence suggesting a positive effect of minimal interactivity on the consumption of a digital experience comes from prior work on interactivity, which suggests that interactivity can enhance consumers' evaluations. For example, when study participants were searching for product information, having control over actions on a website enhanced attitude towards the product (Ko et al. 2005), increased perceived website effectiveness (Song and Zinkhan 2008), enhanced learning and increased decision quality (Ariely 2000). Using structural equation modeling, Ko et al. (2005) examined the antecedents and subsequent implications of interactivity on participants' attitude and purchase intention towards a brand. The authors asked participants to browse a website with a goal of making an online purchase and found that those who indicated a greater intention to interact with the site (such as clicking though more website details, participating in providing feedback to the website and using a search function on the website) also displayed a more positive attitude towards the site. This ultimately led to a more positive attitude towards the brand and greater purchase intention.

Further, Ariely (2000) examined how interacting with an information sequence can influence decision-making. In a series of studies, participants were instructed to rate the quality of nine cameras by searching through information. The researcher either gave participants control by letting them organize how information is presented to them or not. Specifically, participants in the high-control condition could decide what information to look at and for how long. Compared to those who did not have control over the flow of information, those interacting with the information could process it better and make objectively better judgments based on the information given. This effect is attributed to a better match between how participants use and value the information and the order in which the information is presented. Most relevant to the current dissertation is the observation that not only was performance objectively better when participants had control over the flow of information, they also showed better attitude (liking) towards the interface.

In another context, past research examining interactivity suggests a positive relationship between how much people were able to interact with an ad and their reported attitudes and subsequent purchase intention (Schlosser 2003). Specifically, Schlosser examined the effect of interactivity on consumers' attitude and purchase intention towards a product displayed either on a passive site that contained only static graphics and information, or an interactive website that contained the same text and graphics but allowed users to rotate the product in the image. Compared to those who saw the passive site, those who saw the product on the interactive site evaluated it more positively and showed greater intention to purchase it.

In a more recent example, Spielmann and Mantonakis (2018) explored the role of interactivity in the context of virtual tours. In these experiments, participants were shown either a passive online video of the experience, or a 360-degree video that allowed them to move or zoom in and out of the view. The authors found that across different types of experiences (city tours and car-interior tour), having the ability to interact with the content (vs. watching a passive online video) increased attitude towards the focal objects in the tours.

To summarize, prior literature suggests that simple experiences that generate a reaction from an action are preferred and tend to be evaluated positively. In addition, in the context of digital consumption, greater interactivity can help increase the evaluation and subsequent consumption of the focal object. Although prior work suggests that the cognitive effort required by interactive experiences can be harmful (Ariely 2000), in the current context, the (minimal) effort required to interact with the content is unlikely to be perceived as a burden. Further, the negative consequence of self-paced consumption is more relevant when the consumption experience is homogeneous (i.e., the same content is being consumed repeatedly) rather than heterogeneous (in a digital context, it is unlikely that consumers are exposed to the same image, news or video repeatedly and consecutively). Synthesizing results from these extant literatures, I predict that compared to passively consuming a digital experience, even minimal interactivity (e.g. clicking to advance) will increase consumers' evaluation and subsequent consumption of that experience. Formally, I hypothesize the following:

H1a: *Minimal interactivity enhances the evaluation of a digital experience.*

H1b: *Minimal interactivity increases the consumption of a digital experience.*

Explaining Why Interactivity Affects Consumption Behaviour: Alternative Accounts

In this section, I present two alternative accounts that have been offered in the literature to explain the link between interactivity and consumer behaviour — engagement and flow.

One intuitive notion is that an interactive experience is engaging—it draws consumers' attention and connects with them on a visceral level. Although the term "engagement" is not generally well-defined, it tends to refer to "a state of being involved, occupied, fully absorbed, or engrossed in something—sustained attention" (Higgins and Scholer 2009). In other words, an individual is engaged when fully attending to an activity. Prior research has shown that elevated engagement can enhance the enjoyment of an experience (Diehl et al. 2016). In a series of studies, the researchers asked participants to take photos while partaking in a hedonic experience. Compared to those who were not asked to photograph the experience, those in the photo-taking condition evaluated the experience as more enjoyable. The researchers suggest that attention is directed to the experience when participants take photos, which increases how engaged they are with the experience. This enhanced engagement then ultimately increased how enjoyable participants evaluated the experience to be.

In another study, researchers examined how engagement, resulting from a well-designed and easy-to-navigate website, could increase the perceived performance of and future intentions to use a website (Webster and Ahuja 2006). Specifically, participants were randomly assigned to interact with a website that varied in terms of its navigation system and orientation (i.e., how users could get from point A to point B on the site). Using structural equation modelling, the authors found that engagement increased when participants perceived less disorientation from using the website, which in turn increased performance and future intentions to use the website. Indeed, these results suggest that engagement can be an important contributor to positive digital experiences. However, the process of re-directing attention to become engaged is an effortful one. In other words, individuals need to be actively exerting cognitive resources when they are engaged with an experience. Therefore, a fully absorbed state of engagement is unlikely to be affected by minimal interactivity.

Related to engagement is the concept of flow, defined as a state "in which people are so involved in an activity that nothing seems to matter" (Csikszentmihalyi 1997). Flow has been a prominent explanation for consumer behaviour in online and digital experiences (Hoffman and Novak 1996). It has also been used to guide website designs to enhance interactions between the user and the site (Zeithaml, Parasuraman and Malhotra 2002). In the online context, flow is described as having four distinct characteristics. First, the individual experiences high levels of skill and control. Second, the individual experiences a high level of challenge, but this challenge is matched with his or her skill level. Third, as a result of the match between high skill level and high challenge, the individual experiences intense, focused attention in the experience. This often means the individual is so focused that the passage of time and one's surroundings are forgotten. Finally, flow is often enhanced by interactivity and telepresence (Novak et al. 2000). Specifically, the authors explored flow from a product-search perspective and argued that it is a cognitive process that takes place while consumers navigate the online environment. Those who experience a flow state during the online navigation would find themselves losing self-awareness, with the end state being a desirable and "gratifying" feeling (Novak et al. 2000). Existing research in flow and online behaviour also suggests that flow can be evoked when consumers are interacting with online information search, and it can increase subsequent evaluation of both the website and the brand being searched (Mathwick and Rigdon 2004). Specifically, Mathwick and Rigdon (2004) asked participants to engage in online search tasks and answer questions regarding their search skills—the perceived challenge of web search. They then used cluster analysis to examine how the balance between existing search skills and demand for navigating a search contributes to higher experiential value (described as perceived play). Additionally, the results from correlational analyses suggest that greater perceived play is positively associated with consumers' overall attitude. Despite flow having an important role in shaping how consumers evaluate a digital experience, it seems unlikely that minimal levels of interactivity involve sufficient skill or challenge to evoke a state of flow.

To summarize, engagement and flow have both been used in prior literature to explain why interactivity has a positive influence on a consumption experience. However, given the minimalistic nature of minimal interactivity, it is unlikely to trigger the same types of attentional effort required to change users' engagement level. Nor it is likely to evoke enough challenge for users to enter into a flow state. As such, these pre-existing explanations are insufficient to explain why merely possessing active control over a digital experience can positively impact the consumption experience.

Alternatively, I argue that even when a digital consumption experience requires little skill and is not challenging or particularly engaging, minimal interactivity (such as a click to continue) can still enhance the experience. Specifically, compared to passively consuming content, performing a single simple action that exercises control over the digital experience will lead to more positive evaluations and greater consumption intention.

To explain this effect, I introduce the concept of thought speed and propose that changes in thought speed drive this positive impact of minimal interactivity on consumer behaviour. In the section below, I review the literature on this construct and speculate why thought acceleration might be a mechanism to explain the positive effect of minimal interactivity on a digital consumption experience.

Conceptualizing Thought Speed

To better illustrate the general concept of thought speed, imagine an afternoon spent lying on the beach enjoying the sunshine and listening to the waves, while thoughts occur at a leisurely pace. Contrast that with being engaged in a lively classroom debate during which thoughts come rapidly to mind. Despite the nature of the thought content, one distinction between the two examples is the rate at which thoughts are occurring. Formally, thought speed is defined as the total thoughts occurring per unit of time (Pronin and Jacobs 2008). This differs from the number of thoughts in the same way that driving a longer distance differs from the speed of travel. Faster thought speed means more thoughts within a period of time, the same way that driving faster means covering more distance in the same period of time. In other words, holding the unit of time constant, having more thoughts equals faster thought speed.

The existing literature documents the idea of thought speed in both clinical and experimental psychology settings. Extreme cases have been observed in clinical psychology among depressed patients who report that thought speed is grinding to a halt, while patients experiencing manic episodes report that their thoughts are occurring extremely quickly (Miklowitz and Johnson 2006). It is worth noting that thought speed is the *subjective* evaluation of one's thinking speed. As such, it is a meta-cognitive experience that assesses the thought experience as a function of how many thoughts occurred within a timeframe. Outside a clinical setting, the subjective feeling of thought speed can be changed through simple tasks that alter the pace of thinking. In one study, the researchers changed participants' reading speed by manipulating the pace at which sentences appear on the screen (Pronin and Wegner 2006). Participants' thought speed was found to be faster when sentences were presented at a faster speed. In other words, when sentences appear on the screen more rapidly, participants are exposed to more sentences in a set amount of time. As a result, they have more information to think about and to process, so thought speed accelerates.

In another set of studies, the experimenters induced faster thought speed by asking participants to brainstorm ideas either rapidly or more slowly (Pronin et al. 2008). In a particular study (Study 1), participants were asked to brainstorm for ten minutes and then to freely generate as many ideas as possible or to only generate good ideas. The researchers found that those who were asked to freely generate ideas reported greater thought speed than those who were asked to be selective when generating ideas.

In another example, thought speed has been studied by changing visual stimuli. For example, Pronin et al. (2008) randomly assigned participants to watch a three-minute-long muted clip in one of three conditions: 1) fast-forward speed, 2) normal speed or 3) a slowed-down condition. They found that compared to those in the normal and slow conditions, participants in the fast-forward condition reported that they were thinking faster. Taken together, these findings suggest that the actions we take have a significant influence on our cognitive speed. In the next section, I explain how minimal interactivity influences thought speed.

The Effect of Minimal Interactivity on Thought Speed

To connect interactivity to thought speed, I draw on prior work that discusses the link between mental representation and behaviour. William James (1890) first introduced the notion of ideomotor theory of action and stated that any mental representations of an action can trigger corresponding expectations regarding that action. This concept of mental representation of action includes both the "mental content related to the goal and to the consequences of the given action and to the neural operations supposed to occur before an action begins" (Grèzes and Decety 2001; p. 15). Since then, streams of research have investigated and found results demonstrating this link between thinking about an action and carrying out that behaviour. For example, researchers have studied how mental representations affect brain activation and found that when individuals form a mental representation of an action, the brain region that is responsible for physically engaging in that action is also activated (for a review see Schack and Ritter 2009).

Another study suggests that even just thinking about the words associated with an action can be sufficient for neutral activation of the physical movement. Using neuroimaging, Péran et al. (2010) randomly assigned participants to three conditions and presented pictures of objects to them while performing an fMRI scan. Participants were randomly assigned to 1) generate verbs that are associated with themselves taking an action, 2) form a mental representation of themselves taking an action with an object, or 3) name the object. The experimenters exposed each picture for 1500ms, and participants saw a total of 144 images each. Compared to those in the control condition (object naming), those in the verb-generation and action-rehearsal conditions activated a common frontal-parietal network that is associated with object manipulation.

In the domain of social psychology, Dijksterhuis and Bargh (2001) argue that activation of a mental representation associated with social perception can directly influence how an individual acts in social situations. Specifically, thinking about a trait during a social interaction makes it more likely for individuals to act in a manner consistent with that specific trait. For example, when Bargh, Chen and Burrows (1996) primed participants with the concept of rudeness or politeness, compared to a control condition with no priming, those in the rudeness condition were significantly more likely to interrupt a conversation (Experiment 1). To summarize, taking an action triggers thinking about the expected experience of that behaviour, and merely considering engaging in action induces mental representations of the behaviour, which consequently increase thought speed (Yang and Pronin 2018).

In this research, I define minimal interactivity as a single simple action that exercises control during a consumption experience. All else being equal, additional thought is required when one exercises control over a consumption experience, as compared to passively consuming the same experience. For example, imagine reading online news headlines at a pace predetermined by the content provider versus being able to control the flow of the same headlines on the same device. Similarly, consider the difference between viewing images on Instagram or Snapchat as part of a story at a speed determined by the social media platform versus flipping through the same series of images on that same platform at a consumer-controlled pace—or when Facebook or Twitter auto-play a video rather than letting the user click to play. Even if you end up spending an equal amount of time reading the same headlines or viewing the same images and videos, exercising control over the feed of stories or images requires additional thought and decision making. Therefore, I predict that compared to passively consuming digital content, even minimal interactivity in the form of clicking to advance should increase consumers' thought speed. Formally,

H2: *Minimal interactivity accelerates thought speed.*

The Moderating Role of Multitasking on Thought Speed

Interestingly, it seems that even when engaged in the passive consumption of a media experience such as watching television, consumers are likely to be multitasking (IAB 2017; Kats 2018), which occurs when people "engage in multiple tasks aimed at attaining multiple goals simultaneously" (Sanbonmatsu et al. 2013). Prior literature has focused on understanding the effect of multitasking on learning in the classroom and reports that multitasking decreases information retention (Sana, Weston and Capeda 2013) and impairs learning (Smith et al. 2011). As previously mentioned, research suggests that when Americans watch television, 81% are simultaneously interacting with a second screen (IAB 2017; Kats 2018). This is not exclusive to a particular generation, as all generations engage in media multitasking—concurrently consuming two or more forms of media (Carrier et al. 2009).

In a study conducted in the US with more than 1,000 participants, Carrier et al. (2009) investigated whether media multitasking behaviours differ across generations by administering an online questionnaire. The experimenters described three broad generations: Baby Boomers (born between 1946 and 1964), Generation X (born between 1965 and 1979) and the Net Generation (born between 1980 and the present). Participants in this study were asked to indicate 1) which tasks they multitask in, and 2) how difficult it is to multitask. The authors then identified 12 tasks (e.g. TV, video games, texting, web-surfing, etc.) and generated 66 possible combinations of multitasking scenarios. On average, the older generation engages in 23.2 combinations, and this number increases with the younger generations (32.4 for Gen Xers and 37.5 for Net Geners). Further, while Baby Boomers reported multitasking to be more difficult, there was no difference between the Gen Xers and Net Geners. Indeed, multitasking while consuming media is a prevalent behaviour across generations.

Central to the current dissertation is the effect of multitasking on thought speed, and according to existing research, thought acceleration is induced by situations that involve increased cognitive or behavioural demands (Yang and Pronin 2018). For example, when faced with new stimuli, the brain needs to rapidly identify and process that stimuli to prepare the body for a series of behavioural actions (Pronin 2013). This allows the individual to dodge danger, or to take advantage of opportunities and rewards such as identifying valuable resources and generating different solutions (Eckart and Bunzeck 2013).

Overall, incorporating technology (vs. not) into an experience tends to increase cognitive demand. For example, the use of video (vs. no video) in learning has been shown to increase cognitive load (Homer, Plass and Blake 2007). Furthermore, even the *mere presence* of technology can increase cognitive demands (Thornton et al. 2014; Ward et al. 2017). For instance, Thornton et al. (2014) first demonstrated that the presence of a cellphone can exert extra cognitive demand and influence performance on complex tasks. In the study, the experimenter placed either a cellphone or a notebook on participants' desks while they performed a series of cognitive tasks that differed in terms of difficulty. Interestingly, the mere presence of a cellphone added cognitive demand for more difficult tasks, but not for the simpler tasks. In a recent example, Ward et al. (2017) examined the effect that the mere presence of one's own cellphone has on individuals' cognitive resources. In the study, the researchers randomly assigned participants to three conditions. In one condition, participants were asked to leave their personal cellphone in a different room, while in the other two conditions participants were asked to either leave their cellphone on the desk face down or to keep the cellphone with them in their pocket or bag. Then the researchers asked participants to complete two tasks that measured cognitive capacity. Ward and colleagues found that participants without their phone present in the room significantly outperformed those who had a phone on the desk, and also outperformed those who had kept their phone on them. Together these studies show that the presence of technology alone can create additional cognitive demand, and given that thought speed is a function of the number of thoughts occurring per given unit of time, I argue that when people are concurrently thinking about different things—for example, a television program and what is happening on social media on a second screen—thought speed will tend to accelerate.

One important factor to consider in terms of cognitive demand is its relationship with available cognitive resources. Our cognitive resources are devoted to processing and maintaining information. When there are fewer stimuli to attend to, more attentional resources are available and vice versa. As stated in the previous section, thought speed is a subjective evaluation of one's thinking speed. In other words, it is a meta-cognitive experience that requires an assessment of the experience. I argue that because cognitive resources are limited (Kahneman 1973; Wickens 1980), this increase in thought speed likely depends on consumers' working memory and attentional resources, such that it will plateau when cognitive resources are fully allocated. Although extreme speed of thought is possible to experience, these racing thoughts often serve as one of the diagnostic criteria for manic episodes (DSM IV; American Psychiatric Association 1994) and are less frequently observed in non-clinical populations. Put differently, an average person is more likely to experience, and report, fast thinking speed within a given range, rather than feeling and reporting extremely fast (or slow) thinking speeds that tend to be observed in a clinical setting (Pronin and Jacob 2008). As a result, adding cognitive demand via multitasking can elevate thought speed only insofar as resources are available to facilitate that increase. This suggests a ceiling effect when cognitive resources are fully allocated, and additional demands do not further increase thought speed. Therefore,

> ***H3:*** *Multitasking moderates the relationship between minimal interactivity and thought speed, such that additional cognitive demands affect thought speed during passive consumption experiences (but not during interactive consumption).*

The Role of Arousal on Thought Speed

The extant literature suggests a relationship between thought speed and physiological arousal (Yang and Pronin 2017). This idea has roots in the concept of entrainment, which is a widely observed phenomenon in physical, biological and psychological systems (Thaut 2015). Entrainment occurs when two or more distinct systems achieve synchronicity. For example, physicist Huygens famously observed that pendulum clocks in the same room could be set at different paces but will end up all falling into sync. Moreover, audiences in an auditorium will often clap to the same rhythm, and people sitting side-by-side in rocking chairs will reach coordination (Richardson et al. 2007). In other words, two distinct systems, such as our bio-physical system and our psychological system, can achieve synchronicity.

In the current context, work across disciplines suggests that physiological arousal and psychological processes can be synchronized such that physiological response triggered by a high arousal state could contribute to accelerated thinking speed. In an extreme example, mountain climbers who live through near-death experiences—an extremely high state of arousal—indicate that their thinking during the crisis accelerated dramatically (Noyes and Kletti 1972). Additionally, research from clinical psychology suggests that stimulant drugs that increase arousal, such as cocaine, amphetamines, and caffeine, also induce faster thinking (Asghar et al. 2003; Heilbronner and Meck 2014; Smit and Rogers 2000; White, Lott and de Wit 2006). In a study that examined the effect of caffeine on task performance, participants were administered 0, 1 or 2 mg/kg of caffeine and completed a task that measured reaction time (Yeomans, Ripley, Davies, Rusted and Rogers 2000). The researchers found that besides reporting subjective mental alertness, participants in the study who received caffeine responded to the task at a faster speed than those who did not receive caffeine. These findings suggest that thought speed accelerates after receiving a stimulant that changes arousal levels.

In a different context, studies indicate that musical tempo can positively affect thought speed—such that faster tempo increases thought speed (Khalfa et al. 2008; Trochidis and Bigand 2013). Specifically, participants in these studies were asked to listen to a Mozart sonata performed by a pianist, and the music file was edited to produce variations in tempo (fast or slow). Participants in the fast-tempo condition reported higher arousal level despite the composition of the song being identical. Although the authors did not make an explicit argument about changes in thought speed, given that more musical notes need to be processed within the same unit of time for the fast-tempo condition, there is a high correlation between high arousal level and faster thinking speed. Existing research in consumer behaviour similarly suggests that fast-tempo music can increase arousal (Di Muro and Murray 2012; Husain, Thompson and Schellenberg 2002).

Although prior work has not formally examined the relationship between thought speed and arousal, the existing findings do suggest a possible link. In particular, I predict that greater arousal should accelerate thought speed. Formally, I hypothesize:

H4: *As arousal increases, so too does thought speed.*

The Effect of Thought Speed on Evaluation and Consumption

By definition, greater thought speed means more mental activity per unit of time and, like other types of subjective productivity, I expect this to elevate evaluations of an experience. In other words, I predict that when thought speed increases, consumers will report that they use their time more effectively, feel busier and less bored, and generally enjoy the experience more.

Preliminary evidence supporting this notion comes from Duff and Sar (2015), who found that when they increased the speed of animation in an advertisement, both thought speed and intention to purchase the advertised product also increased. In a series of studies, participants were randomly assigned to three different conditions (fast, slow or moderate) and were presented with product messages that appeared at fast, slow or moderate speeds; and then they were shown a single ad and asked to evaluate the product. Participants self-reported their thought speed and their intention to try the advertised product. The researchers found that thought speed accelerated after participants were presented with advertising messages that appeared at a faster pace, and that intention to try a subsequent product was also greater. However, the authors treated thought speed and purchase intentions as two separate dependent variables, so the relationship between the two was not examined. In contrast, I contend that there is a causal link between thought speed and the evaluation and consumption of hedonic experiences.

This prediction is supported by prior work that examined productivity effects and found that consumers prefer hedonic experiences in which they do more within a given period (Keinan and Kivetz 2010; Luo, Ratchford and Yang 2013; Murray and Bellman 2011). For example, in a recent study of online gaming, Bellman and Murray (2018) demonstrated that enhanced enjoyment and productive use of time, in combination, are the critical determinants in the evaluation of digital experiences. Specifically, the researchers asked participants to first practise playing a video game using one hedonic interface and then to switch to another interface. While playing, participants' performance was captured by their relative task-completion time, which is indicative of how productive their playtime is. Further, participants received positive, negative, neutral or no feedback about their performance in the game. This feedback triggers emotional responses that directly influence how enjoyable players perceive the game to be. The authors found that participants indeed preferred the platform that resulted in more productive playtime, and that elicited a positive psychological response. This suggests that better use of time can contribute to more positive evaluations of a digital hedonic experience.

Importantly, consistent with prior work on productive hedonism, I also expect that the accelerated thinking needs to be about the experience itself. For example, randomly clicking on a different window while watching an Instagram story might increase thought speed, but it should not affect feelings of productivity or enjoyment of the Instagram experience. Similarly, multitasking by working on one's taxes while watching television should not enhance evaluations of the TV show. In both examples, additional thoughts were generated through extraneous tasks that are irrelevant to the primary consumption experience. Thus, I contend that for minimal interactivity to increase thought speed in a way that positively affects consumption of digital content, additional thought should be directly related to the experience.

To summarize, prior work has shown that consumers tend to feel more productive when they are thinking more rapidly (Duff and Sar 2015). Further, when consumers feel productive during an activity they tend to evaluate it more positively (Keinan and Kivetz 2010; Luo et al. 2013; Murray and Bellman 2011). As such, when an experience accelerates thought speed, evaluation of that experience should also increase. Notably, I predict that when a consumer thinks about exercising control over a media-consumption experience, thought speed should increase in a manner that affects evaluations of that experience and, ultimately, future consumption behaviour. Building on hypotheses 1a and b, I formally hypothesize the following:

H5: *Minimal interactivity accelerates thought speed, which in turn enhances consumers' evaluations of a digital experience.*

Furthermore, prior work has shown that behavioural intentions are guided by our evaluation, and we tend to perform activities and consume experiences that we evaluate positively (Alba and Williams 2013; Andrade 2005; Klaaren, Hodges and Wilson 1994; Madzharov 2019). Therefore, I predict that the positive effect of using a single simple action to exercise control over an experience increases future consumption of that experience because it elevates consumers' evaluations. More formally,

H6: *Minimal interactivity increases future consumption of a digital experience through a serial process of increased thought speed and elevated evaluations.*

Affect Elicited by Media Content as a Boundary Condition

In the context of digital consumption, the content of the media we consume (independent of how it is consumed) can directly influence how we feel (Goldberg and Gorn 1987; Hargreaves and Tiggemann 2002; Zillman 2000). Media content itself can be pleasant or unpleasant. Early work shows that viewers are more likely to experience happiness when watching a happy (vs. sad) TV program (Goldberg and Gorn 1987). As another typical example, encountering a news headline about the local sports team can be pleasant when they win and unpleasant when they lose, regardless of whether that headline was viewed passively or interactively.

As such, pleasantness (or unpleasantness) of the content is critical to consider because a key driver of a consumer's evaluation of an experience is the affective state generated by that experience (Andrade 2005; Mano and Oliver 1993; Pham et al. 2001). Specifically, affect refers to a "feeling state", which is different from cognitive assessments of a specific object or event (e.g. "The introduction of the original iPhone was revolutionary.") or purely "liking" (Cohen, Pham and Andrade 2006). In the current context, I refer to affective states related to particular experiences, rather than someone's general mood state, which is usually non-specified and lacks source identification (Cohen et al. 2006, p. 5). These affective states can help consumers make better evaluations and judgments about an experience because we often use feelings as diagnostic information (Schwarz and Clore 1983).

Indeed, past work has shown consistently that how individuals feel can directly impact the evaluation of a target, whether that target is another person or a consumer good (Bagozzi, Gopinath and Nyer 1999). For example, in the consumer context, feelings of disgust can arise knowing that a product has been touched or contaminated by another consumer, which subsequently reduces the evaluation of the product and consumers' intention to consume it (Argo, Dahl and Morales 2006). Overall, we tend to evaluate the target more positively when we feel pleasant rather than unpleasant.

To summarize, during a digital consumption experience, the content we consume can trigger specific affective states, regardless of whether it is consumed in an interactive or passive format. Furthermore, these feelings of pleasantness or unpleasantness can directly influence how we evaluate the experience. Thus, an experience that contains content that elicits unpleasant affect will be evaluated more negatively than an experience that contains content that elicits pleasant affect. Taken together, I expect that the feelings generated by the content consumed will act as a boundary condition by directly affecting evaluations of that consumption experience. More formally,

H7: *Content moderates the positive effect of interactivity on evaluation, such that an unpleasant experience attenuates this effect.*

Summary

I contend that minimal levels of interactivity can have a powerful positive effect on evaluations of an experience and subsequent consumption behaviour (hypotheses 1a and b), as compared to passive media consumption. Further, this positive effect is driven by accelerated thought speed such that even minimal interactivity can trigger more thoughts per unit of time (hypothesis 2) and faster thinking speed enhances the evaluation and consumption of a digital experience (hypotheses 5 and 6). I examine multitasking (hypothesis 3) and arousal level (hypothesis 4) as two moderators influencing the effect of minimal interactivity on thought speed. Finally, since variations in affective content can directly influence how individuals evaluate a digital experience, I examine the effect of the emotional valence (pleasant vs. unpleasant) of the consumed content as a potential boundary condition on the effect of minimal interactivity (hypothesis 7). Figure 1 illustrates the conceptual model.

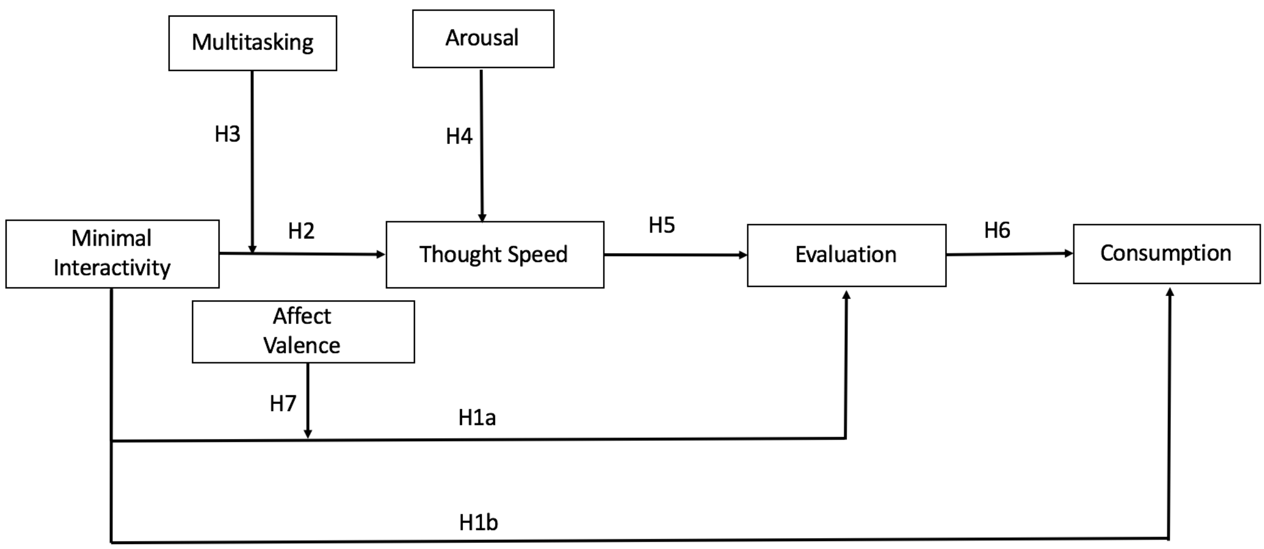


Figure 1. Conceptual Model

CHAPTER 2: EMPIRICAL EVIDENCE

In this chapter, I present a series of studies that test the hypotheses proposed in Chapter 1. Additionally, I present one pre-test that is used to calibrate the experimental paradigm.

In Studies 1A and 1B, I test the positive effect of minimal interactivity using two different digital formats—images (Study 1A) and news headlines (Study 1B). These studies demonstrate that compared to passively consuming the same content, even minimal interactivity enhances the digital experience (hypothesis 1a) through thought acceleration (hypotheses 2 and 5). Studies 1A and 1B also find that engagement, flow and affect are insufficient as potential alternative explanations.

Study 2 tests a boundary condition of this positive effect—that is, how content that varies in terms of emotional valence (unpleasant or pleasant) interacts with interactivity to impact digital consumption. As hypothesized (hypothesis 7), pleasantness of the content has a direct influence on how individuals evaluate an experience, regardless of whether they had active control over the experience or not.

Studies 3 and 4 test moderators that influence the relationship between minimal interactivity and thought speed. Specifically, Study 3 finds evidence to support the prediction that multitasking, operationalized with a standard cognitive-load manipulation, moderates the effect of interactivity on thought speed (hypothesis 3). This study also demonstrates that minimal interactivity influences evaluation, which has a subsequent effect on consumption (hypotheses 1b and 1b). In Study 4, I test the role that arousal plays (hypothesis 4) and find that high arousal does increase thought speed, but that the effect is independent from the effect of minimal interactivity on thought speed. It is also worth noting that although both multitasking and high arousal levels increase thought speed, neither of those factors have an impact on the evaluation or future consumption of the experience.

To illustrate that these effects can be generalized to actual behaviours, Study 5 replicates the minimal-interactivity effect using a consequential consumption task (hypothesis 1b).

The main goal for Studies 6, 7A and 7B was to test for alternative explanations. Study 6 provides further support for the predicted serial-mediation process and tests two alternative explanations by 1) contrasting simple motor actions with action that exercises control over the experience, and 2) asking participants to estimate the number of images they viewed during the media consumption experience (which allows me to rule out the possibility that the observed effects are an artifact of the design and driven by differences in participants' subjective perceptions of the number of images viewed).

Studies 7A and 7B contrast minimal interactivity—that is, a single simple action that provide control over the digital experience—with a *general* sense of control. As highlighted in the previous chapter, the sense of control is a fundamental need for us to maintain (Landau et al. 2015; Lefcourt 1973; Skinner et al. 1988; White 1959). Because the sense of control is such a universal need and drive for human behaviours, it is critical to determine that the effect of minimal interactivity is *not* driven by the lack of control in the passive conditions. Therefore, I aim to demonstrate that minimal interactivity can enhance evaluation and consumption, as opposed to low levels of control dampening the effect. To tease apart the difference I manipulate the sense of control in two ways. In Study 7A, I directly manipulate the feelings of control associated with the task, and in Study 7B I give participants an alternative task that restores their sense of control. In both studies, I do not find evidence supporting control as an alternative explanation.

Pre-Test

A pre-test was conducted to calibrate the subsequent experimental paradigms with two goals in mind. First, I wanted to use the pre-test to establish an optimal consumption length for the subsequent studies. By doing so, I minimize the likelihood of exposing participants to fatigue or satiation during the experience. Second, I aimed to establish a comparable consumption time for those in the passive (control) condition. In other words, I wanted to allow participants in the passive condition to spend a similar amount of time on the digital experience as participants in the interactive condition (who are able to use a single simple action to exercise control over the experience).

Participants, Experimental Design and Procedure

A total of 344 Amazon Mechanical Turk (MTurk) participants completed the study (M_{age} = 37.0; 47% female). In this pre-test, participants were randomly assigned to one of five conditions and were asked to view a series of (3, 10, 20, 30 or 40) images by clicking on a button to proceed to the next image.

All images were selected from the International Affective Picture System (IAPS) based on ratings of neutral valence (means ranging from 2.5 and 3.5 from IAPS standard) and moderate arousal level (means ranging from 3 and 5 from IAPS standard; Lang and Bradley 2007)

After viewing the images, participants were asked to evaluate the experience based on a series of questions: “Did you enjoy the viewing experience?”; “Did you feel like you used your time effectively?”; “Did you feel bored?” (reverse coded); “Did you feel busy?”; “Were you engaged in the experience?”; “How much attention did you pay to the experience?”; (1 = not at all, 5 = very much). Participants were also asked to evaluate their mood by responding to the 20-item PANAS scale (Watson, Clark and Tellegen 1988).

Results

First, the number of images that participants saw in the pre-test did not influence how they evaluated the experience, nor did it affect their mood (Table 2).

Second, participants spent on average 4.61 seconds looking at the images (SD = 7.69). The average amount of time spent per each image did not differ across conditions (*p* =.779).

Table 2. Descriptive Statistics for Pre-Test

		Numbers of Images				
		3	10	20	30	40
Engagement	*M*	3.10	3.01	3.03	3.13	3.04
	SD	1.19	1.28	1.22	1.10	1.21
Overall Affect	*M*	2.30	4.99	5.14	4.84	3.38
	SD	8.19	6.46	7.04	7.08	8.96
Positive Affect	*M*	54.39	55.90	55.94	56.46	54.65
	SD	8.18	6.04	6.28	8.13	9.15
Negative Affect	*M*	52.10	50.92	50.80	51.61	51.26
	SD	3.92	3.87	3.90	3.31	3.70
Attention	*M*	4.42	4.68	4.41	4.50	4.49
	SD	0.80	0.60	0.77	0.72	0.84
Enjoyment	*M*	2.99	3.07	2.81	3.04	2.91
	SD	1.16	1.16	1.17	1.11	1.18
Effective Time Use	*M*	3.31	3.11	2.98	2.91	2.88
	SD	1.18	1.19	1.18	1.24	1.29
Boredom	*M*	1.90	1.82	2.02	1.93	1.90
	SD	0.76	0.80	0.79	0.69	0.76
Busyness	*M*	2.35	2.32	2.48	2.44	2.49
	SD	1.20	1.12	1.14	1.09	1.19

Study 1A

Study 1A examines the impact of minimal interactivity on consumers' evaluations (hypothesis 1a) and the role played by thought speed in this process (hypotheses 2 and 5). This study manipulates interactivity at a minimal level using a single click to advance from one image to the next. In addition, I test three potential mediators: engagement (Higgins 2006), flow (Csikszentmihalyi 1997; Novak et al. 2003) and affect (Isen and Shalker 1982; Peace, Miles and Johnston 2006; Zanna, Kiesler and Pilkonis 1970).

Participants, Experimental Design and Procedure

A total of 191 undergraduate students (M_{age} = 20.07; 60% female) were randomly assigned to one of two conditions—*interactive* or *passive*—in a between-subjects design. Participants in both conditions saw a series of 20 images (in a randomized order). While participants in the interactive condition clicked on a button to proceed to the next image, those in the passive condition were exposed to each image for 5 seconds before it auto-advanced to the next one. I designed the passive condition based on the results from pre-test.

Similar to the pre-test, all images were selected from the International Affective Picture System (IAPS) based on ratings of neutral valence (means ranging from 2.5 and 3.5 from IAPS standard) and moderate arousal level (means ranging from 3 and 5 from IAPS standard; Lang and Bradley 2007).

I selected moderate levels for two reasons. First, I avoided high levels of boredom and low levels of engagement in the content of the media because I wanted participants to be involved in the experience. In terms of ecological validity, it seems unlikely that consumers would intentionally seek out and consume content that is boring and unengaging. Second, although consumers are more likely to seek out and consume exciting and captivating media content, the effects of high levels of engagement and low levels of boredom have been previously studied. As reviewed above in Chapter 1, a series of studies conducted in the context of photo-taking suggests that greater engagement in an experience does increase consumers' evaluations (Diehl et al. 2016). Thus, I use moderate levels of boredom and engagement, which allow demonstration of the power of interactivity even when the content itself is not highly engaging.

After participants saw the images, they were asked to evaluate the experience ("Did you enjoy the viewing experience?"; "Did you feel like you used your time effectively?"; "Did you feel bored?" (reverse coded); "Did you feel busy?"; 1 = not at all, 5 = very much). These items were averaged to create a measure of evaluation (α = .71).

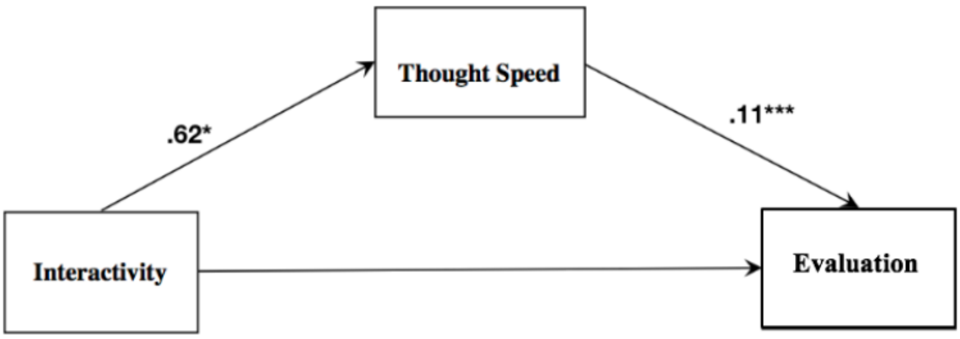
To measure thought speed, I used a single-item scale from prior thought speed research (Pronin and Wegner 2006). Specifically, I asked participants to respond to the following question: "Sometimes people have the feeling that their thoughts are coming slowly, and other times people feel that their thoughts are 'racing'. What did you feel was the speed of your thoughts as you went through the images? (1 = very slow, 9 = very fast)." Use of this single-item, which has effectively captured thought speed in prior work (e.g. Pronin and Wegner 2006; Pronin and Jacobs 2008; Rosser and Wright 2016), is consistent with research demonstrating the predictive validity of such a measure (Bergkvist and Rossiter 2007; Drolet and Morrison 2001).

Additionally, participants completed two measures of affect: 1) the PANAS scale (Watson et al. 1988), and 2) two single-items measuring arousal (0 = low, 10 = high) and valence (0 = unpleasant, 10 = pleasant). I also measured participants' engagement with the experience ("How engaging did you find this viewing experience to be?"; 1 = not at all, 5 = very much). Finally, participants in all conditions responded to the 13-item Flow Short Scale (Engeser and Rheinberg 2008), followed by demographics questions.

Results

Thought Speed and Evaluation. A MANOVA was used to compare participants' thought speed and evaluation of the experience between the two conditions. Supporting hypothesis 2, the results showed a significant main effect of interactivity on thought speed, such that participants in the interactive condition (*M* = 5.79, SD = 1.94) reported faster thought speed than did those in the passive condition (*M* = 5.17, SD = 1.77; $F(1, 189) = 5.37$, $p = .022$, $\eta^2_p = .028$). Additionally, supporting hypothesis 1a, there was a significant main effect of interactivity on evaluation, such that participants evaluated the experience more positively if they had active control over it ($M_{\text{interactive}} = 2.85$, SD = .79; $M_{\text{passive}} = 2.61$, SD = .74; $F(1, 189) = 4.81$, $p = .029$, $\eta^2_p = .025$).

Mediation Analysis. To assess the mediating role of thought speed (hypotheses 2 and 5), I conducted an analysis using interactivity as the independent variable, evaluation as the dependent variable, and thought speed as the mediator (Figure 2; PROCESS model 4; bootstrap estimation 10,000 resamples; Hayes 2013). The indirect effect was significant (β = .07, SE = .03; 95% CI = .01, .14), indicating mediation, whereas the direct effect became nonsignificant (β = .18, SE = .11; 95% CI = -.04, .39). These results indicate that interactivity resulted in elevated thought speed (β = .62, SE = .27, $p = .022$), which in turn affected consumers' evaluations (β = .11, SE = .03, $p < .001$).



Direct effect: β = .18, SE = .11; 95% CI = -.04, .39
Indirect effect: β = .07, SE = .03; 95% CI = .01, .14
* $p < .05$; ** $p < .01$; *** $p < .001$

Figure 2. Mediation Model

Alternative Mechanisms

In addition to thought speed, I tested three other plausible mechanisms. I did not find a significant effect of interactivity on engagement ($M_{\text{interactive}}$ = 2.70, SD = .88; M_{passive} = 2.53, SD = .73; $F(1, 183) = 2.10$, $p = .15$, $\eta^2_p = .011$) or flow ($M_{\text{interactive}}$ = 3.83, SD = .60; M_{passive} = 3.93, SD = .71; $F(1, 183) = 1.24$, $p = .27$, $\eta^2_p = .007$). To test the role of affect, I first looked at the effect of interactivity on PANAS and found no significant effect on either positive ($M_{\text{interactive}}$ = 54.67, SD = 6.34; M_{passive} = 53.64, SD = 4.81; $F(1, 183) = 1.56$, $p = .21$, $\eta^2_p = .008$) or negative affect ($M_{\text{interactive}}$ = 50.22, SD = 3.75; M_{passive} = 49.91, SD = 3.41; $F(1, 183) = .33$, $p = .56$, $\eta^2_p = .002$). I also tested the effect of interactivity on single-item measures of arousal and valence; neither effects of arousal ($M_{\text{interactive}}$ = 4.58, SD = 2.32; M_{passive} = 4.52, SD = 1.92; $F(1, 183) = .04$, $p = .85$, $\eta^2_p = .001$) nor valence approached significance ($M_{\text{interactive}}$ = 6.46, SD = 1.97; M_{passive} = 6.60, SD = 1.89; $F(1, 183) = 0.22$, $p = .64$, $\eta^2_p < .001$).

Finally, I ran a series of mediation analyses using interactivity as the independent variable, evaluation as the dependent variable, and each of the potential alternative explanatory variables as mediators (PROCESS model 4; Hayes 2013). None of the alternative mediators were viable. The results of the mediation tests are summarized in Table 3. As discussed above, these results are not particularly surprising given the minimal level of interactivity being examined in this experiment, which does not activate a state of flow, enhance engagement or evoke an emotional response independent of the content of the media being consumed.

Table 3. Mediation Analyses: Alternative Mechanisms

		β	SE	LLCI	ULCI
Flow					
	Indirect effect	.04	.04	-.03	.14
Positive Affect					
	Indirect effect	.01	.02	-.02	.05
Negative Affect					
	Indirect effect	-.01	.02	-.05	.02
Arousal					
	Indirect effect	.01	.04	-.07	.10
Valence					
	Indirect effect	-.02	.03	-.02	.03
Engagement					
	Indirect effect	.10	.08	-.06	.26

Note: Level of confidence for confidence intervals is 95%.

* Based on 10,000 bootstrap samples

Study 1B

Study 1B tests the robustness of the interactivity effect observed in Study 1A (hypotheses 1a, 2 and 5) using a different digital consumption experience—reading news headlines. I further test thought speed as the underlying mechanism by varying the reading speed (fast vs. slow) for those in the passive condition. Reading speed is manipulated in the passive condition at two different levels (see Procedure below). Consistent with prior research, I predict that thought speed will accelerate when participants read at a faster rate (Pronin and Jacobs 2008).

Participants, Experimental Design and Procedure

A total of 189 participants recruited from Amazon Mechanical Turk (MTurk) completed the study (M_{age} = 35.6; 51% female). I followed the experimental paradigm of Study 1A with two differences. First, the domain of the experience changed from viewing images to reading. Specifically, participants were asked to read 20 news headlines (including the title of the headline, along with the first paragraph of the news article) in a randomized order. The news headlines were selected from Reuters.com on December 3, 2017 and were pre-tested with a total of 32 undergraduate students. In the pre-test, participants were asked to evaluate how exciting, boring, positive or negative the news headlines were ("To what extent is the news headline exciting/boring/positive/negative?"; 1 = strongly agree, 7 = strongly disagree). Evaluations for these headlines ranged from 3.84 to 4.97 for excitement, 3.69 to 4.50 for boredom, 3.13 to 4.53 for positivity, and 3.84 to 4.97 for negativity (see Appendix A for full descriptive statistics of these headlines and actual stimuli used). Second, to further examine the effect of thought speed, I manipulated the speed at which participants were exposed to the text in the passive condition. Evaluation was measured using the same four items as in Study 1A (α = .78).

Participants in this study were randomly assigned to one of three conditions: *passive-fast* (10 seconds), *passive-slow* (20 seconds) or *interactive* (click-to-continue). The reading times for the passive-fast and passive-slow conditions were determined by the results from another pre-test (N = 47, M_{age} = 20.1; 49% female), which indicated that the average time to read these headlines was 10.26 seconds (SD = 3.51) for participants who had control over the pace at which the texts progressed. In the main experiment reported below, the mean time for reading in the interactive condition was 11.85 seconds (SD = 5.98), which was faster than the passive-slow condition but slower than the passive-fast condition.

Results

Thought Speed and Evaluation. A MANOVA was used to compare participants' thought speed (hypothesis 2) and evaluations of the experience (hypothesis 1a) across the three conditions. The results showed a significant main effect of interactivity on thought speed ($F(2, 185) = 3.82$, $p = .024$, $\eta^2_p = .040$). Specifically, post-hoc analyses revealed a significant difference between the interactive ($M = 4.62$, SD = 1.37) and passive-slow conditions ($M = 3.90$, SD = 1.61; $t(185) = .72$, $p = .007$); while no significant difference between the interactive and passive-fast conditions emerged ($M = 4.50$, SD = 1.66; $t(185) = .12$, $p = .66$). Between the passive conditions, changes in reading speed increased thought speed, although this effect failed to reach conventional levels of statistical significance ($t(185) = .60$, $p = .053$).

Additionally, as depicted in Figure 3, the results indicated that interactivity increased evaluation, although this effect did not reach conventional levels of statistical ($F(2, 185) = 2.96$, $p = .054$, $\eta^2_p = .031$). Specifically, post-hoc analyses revealed a significant difference between the interactive ($M = 4.26$, SD = 1.19) and passive-slow conditions ($M = 3.77$, SD = 1.37; $t(185) = .50$, $p = .028$) and no significant difference between the interactive and passive-fast conditions ($M = 3.87$, SD = 1.32; $t(185) = .23$, $p = .090$). There was no significant difference between those in the passive (fast and slow) conditions ($t(185) = .10$, p

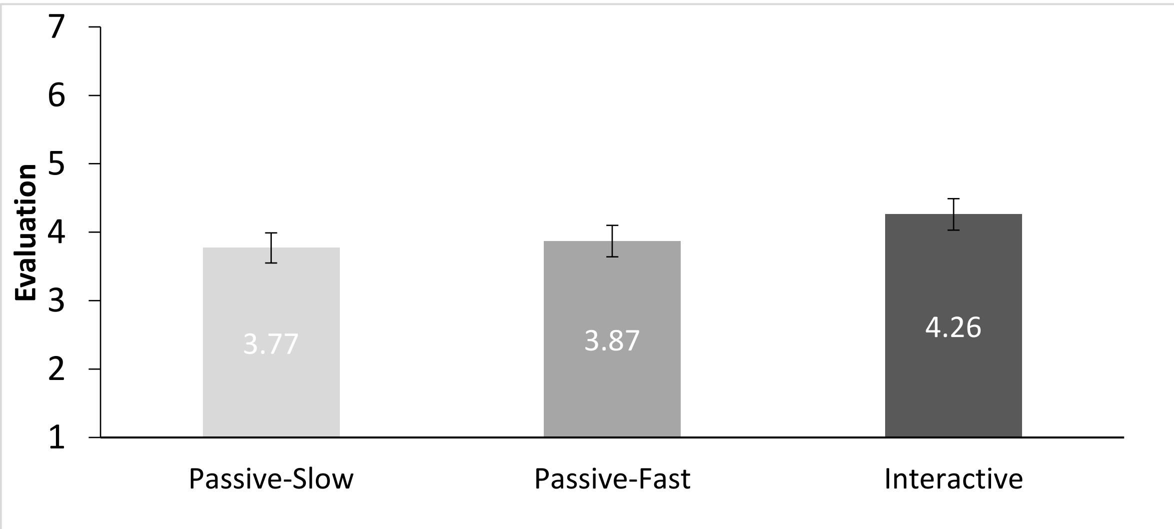


Figure 3. Effect of Minimal Interactivity on Evaluation Compared with Passive-Fast and Passive-Slow Conditions

= .69).

Mediation Analyses. To assess the mediating role of thought speed, I used the three different conditions as the independent variable (specified as a multi-categorical variable in the mediation model with interactivity as the reference group), evaluation as the dependent variable and thought speed as the mediator (PROCESS model 4; bootstrap estimation 10,000 resamples; Hayes 2018). First, relative to the passive conditions, minimal interactivity increased thought speed (β = -.42, SE = .22, *p* = .0585; 95% CI = -.85, .02), and thought speed increased evaluation (β = .13, SE = .23, *p* = .0966; 95% CI = -.33, .59). However, the indirect effect of thought speed was not significant (β = -.17, SE = .09; 95% CI = -.36, .01) as both effects failed to reach conventional levels of statistical significance. This is not surprising given that thought speed did not differ between the interactive and passive-fast conditions. Further, between the two passive conditions, there was a change in thought speed (β = -.60, SE = .31, *p* = .0533; 95% CI = -1.21, .01), such that those in the passive-fast condition reported faster thought speed than those in the passive-slow condition. However**,** the indirect effect was again not significant (β = -.24, SE = .14; 95% CI = -.52, .02), indicating no mediation.

To contrast interactivity with the two passive conditions separately, I then conducted two additional analyses by recoding the reference groups. First, relative to the passive-fast condition, minimal interactivity did not increase thought speed (β = .12, SE = .27, *p* = .6615; 95% CI = -.42, .66). The indirect effect was also not significant (β = .05, SE = .11; 95% CI = -.17, .28). Second, relative to the passive-slow condition, minimal interactivity did increase thought speed (β = .72, SE = .27, *p* = .0073; 95% CI = .20, 1.25). More importantly, this thought acceleration in turn increased evaluations (β = .40, SE = .05, *p* < .001; 95% CI = .29, 50). The indirect effect was significant (β = .29, SE = .12; 95% CI = .07, .53), while the direct effect became insignificant (β = .21, SE = .20; 95% CI = -.19, .61).

Discussion

Studies 1A and 1B demonstrate that interactivity can increase evaluations of a media consumption experience via thought speed acceleration (hypotheses 1a, 2 and 5). The results point to two important main effects of interactivity: on thought speed and on evaluation. This is true in Study 1A, when participants viewed a series of images, and in Study 1B, when they read news headlines.

I test hypotheses 2 and 5 using a series of mediation analyses. I manipulated passive exposure time to the headlines at two different levels in Study 1B and observed that participants in the interactive condition spent, on average, 11.85 seconds reading. This was faster than those in the passive-slow condition (*2*0 seconds) but also slower than those in the passive-fast condition (10 seconds). As expected, thought speed was accelerated in both the interactive and passive-fast conditions, relative to the passive-slow condition. This is noteworthy because those in the interactive condition spent more time on the experience than those in the passive-fast condition, which casts doubt on explanations based on time spent consuming the media content—that is, the effect of interactivity on evaluation cannot be attributed to less time spent on reading.

Additionally, evaluations in the interactive condition were higher than in either of the passive conditions, and the passive conditions were not significantly different from each other. Thus, although speeding up the reading pace accelerates thought speed, that effect does not carry over to evaluations unless the media consumption is interactive. Therefore, using a single simple action to exercise control over the experience appears necessary to accelerate thought speed in a manner that affects evaluations. One possible explanation for why thought acceleration in the passive-fast condition did not increase evaluation in comparison to the passive-slow condition could be that a passive news-headline reading experience is not a pleasant experience regardless of thinking speed. As discussed in Chapter 1, the affective responses elicited by an experience can directly influence the evaluation of it. Therefore, in the next study I test whether the pleasantness (vs. unpleasantness) of the experience can serve as a boundary condition to the positive effect of minimal interactivity.

Study 2

In the context of digital consumption, the content of the media we consume can influence how we feel (Goldberg and Gorn 1987; Hargreaves and Tiggemann 2002; Zillman 2000). Whether consumption is passive or interactive, the media content itself can be pleasant or unpleasant. Thus, one unanswered question from the previous studies is how content might influence the effect of minimal interactivity on evaluation of the experience. As explained in Chapter 1, whether the consumed content is pleasant or unpleasant should directly influence how an experience is evaluated. While mood and emotion play important roles in how consumers evaluate an experience (Miniard, Bhatla and Sirdeshmukh 1992), I focus on the effect that content has on the evaluation process. In other words, I focus specifically on integral emotions generated by the content of the digital experience rather than on incidental emotions triggered by other factors. Given this focus, in Study 2 I examine the effect of content on how the experience itself is being evaluated by manipulating content pleasantness. As predicted by hypothesis 7, unpleasantness of the content has a direct influence on how individuals evaluate an experience, thus potentially mitigating the positive effects of interactivity.

Participants, Experimental Design and Procedure

A total of 399 participants (MTurk, $M_{\text{age}} = 38.2$; 48% female) were randomly assigned to one of four conditions in a 2 (*interactivity*: interactive vs. passive) × 2 (*content valence*: pleasant vs. unpleasant) between-subjects design. Participants in all conditions saw a series of 20 images in randomized order. To manipulate pleasantness, I use the pre-validated

IAPS metrics (Bergmann et al. 2012; Lang, Bradley and Cuthbert 2005). While arousal level was kept constant at 3.05, images were selected based on a +/- two-standard-deviation boundary around 7.04 for the pleasant condition, and 2.25 for the unpleasant condition. After participants saw the images, they were asked to evaluate the experience using the same four-item scale, followed by a single-item measure of thought speed, as in the previous studies. As a manipulation check, participants were asked to rate, on a 11-point bi-polar scale (ranging from 10 = pleasant to 0 = unpleasant), how pleasant (vs. unpleasant) they felt: "Please rate how you felt at the time of the experience. The middle point indicates that you feel neutral, and a selection closer to one label on the side (vs. the other) indicates that you are feeling more so than the other state."

Results

Manipulation Check

Valence. Participants in the pleasant condition (M = 8.06, SD = 2.17) indeed reported greater positive valence than participants in the unpleasant condition (M = 2.06, SD = 2.72, $t(358) = -23.3$, $p < .001$).

Main Analyses

Thought Speed and Evaluation. A MANOVA was used to compare participants' thought speed and evaluation of the experience across the four conditions. As predicted, two separate main effects on thought speed emerged (Figure 4). First, participants in the interactive condition (M = 4.50, SD = 1.46) reported faster thought speed than did those in the passive condition (M = 3.92, SD = 1.54; $F(1, 399) = 14.49$, $p < .001$, $\eta^2_p = .035$). Additionally, unpleasant content (M = 4.36, SD = 1.54) resulted in a faster thought speed, compared to pleasant content, but this difference did not reach conventional levels of statistical significance (M = 4.07, SD = 1.50; $F(1, 399) = 3.38$, $p = .067$, $\eta^2_p = .008$). There was no interaction between the pleasantness of the content and minimal interactivity on thought speed ($F(1, 399) = .267$, $p = .606$, $\eta^2_p = .001$).

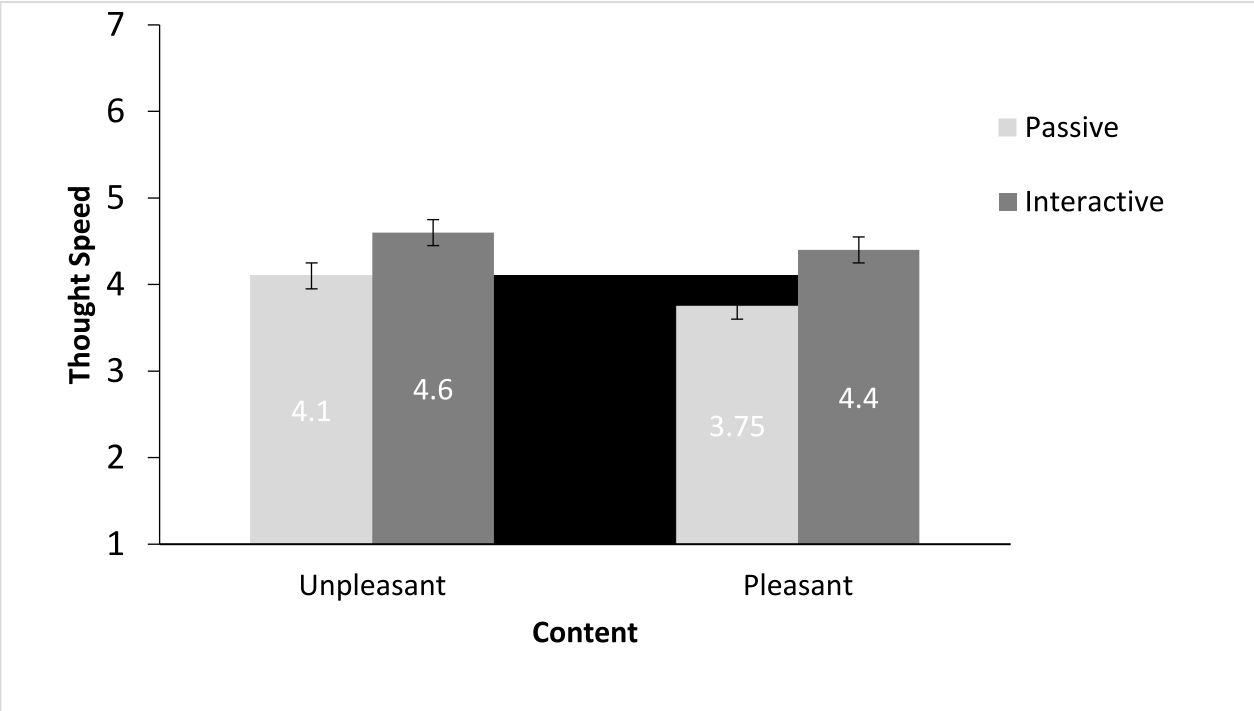


Figure 4. Effect of Minimal Interactivity and Valence on Thought Speed

For evaluation (Figure 5 below), two separate main effects emerged. First, participants in the interactive condition ($M = 3.44$, SD = 1.05) evaluated the experience more positively than did those in the passive condition ($M = 3.27$, SD = 1.18; $F(1, 399) = 3.79$, $p = .052$, $\eta^2_p = .010$). Second, compared to the unpleasant content ($M = 2.93$, SD = 1.22), pleasant content increased evaluation ($M = 3.79$, SD = 1.13; $F(1, 399) = 74.54$, $p < .001$, $\eta^2_p = .153$). The effect of minimal interactivity on evaluation varied between the pleasantness of ($F(1, 399) = 3.17$, $p = .076$, $\eta^2_p = .008$). Pairwise comparisons revealed that there was not a significant difference between the interactive and passive conditions in the unpleasant condition ($F(1, 395) = .014$, $p = .91$). However, there was a significant difference between the two conditions when the content was pleasant, such that participants in the interactive condition (*M* = 3.98, SD = 1.00) evaluated the experience more positively than did those in the passive condition (*M* = 3.60, SD = 1.22; *F*(1, 395) = 6.9, *p* = .009).

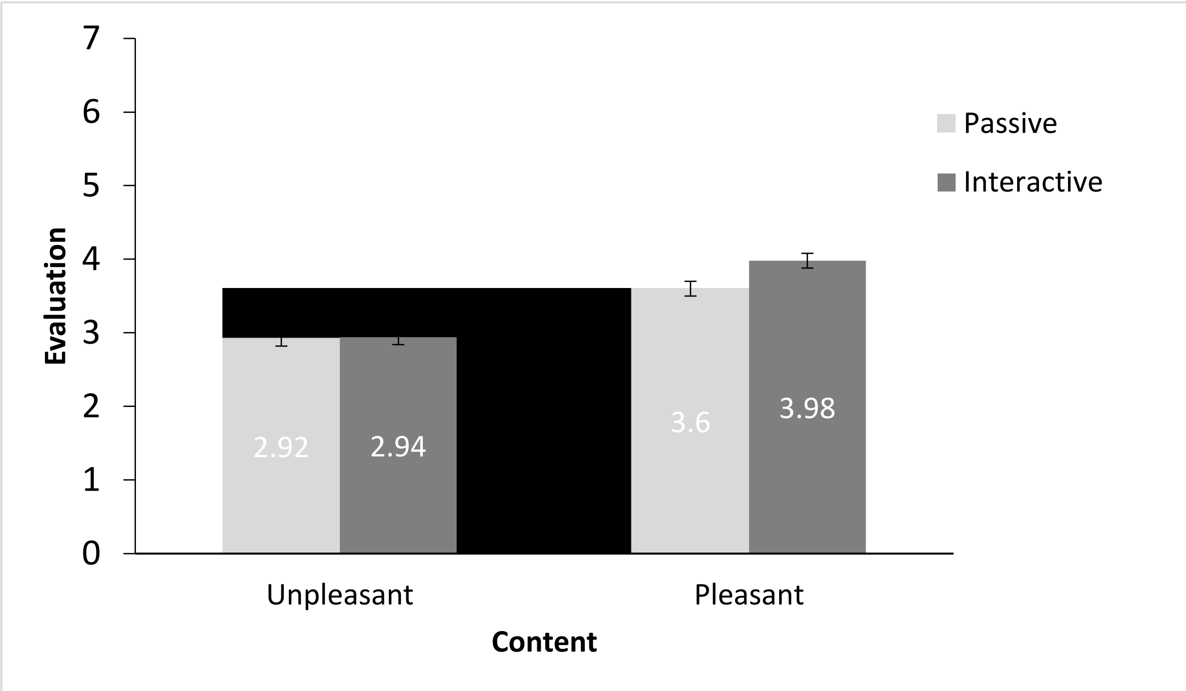


Figure 5 Effect of Minimal Interactivity x Valence on Evaluation

Mediation Analyses. To assess the mediating role of thought speed, I ran a mediation model with interactivity as the independent variable, thought speed as the mediator, evaluation as the dependent variable, and content valence as the moderator (PROCESS model 5; bootstrap estimation 10,000 resamples; Hayes 2013). As expected, interactivity increased thought speed (β = .58, SE = .15, *p* <.001; 95% CI = .28, .87), which in turn increased evaluation (β = .10, SE = .03, *p* = .005; 95% CI = .03, .16). Further, content valence also had a direct impact on evaluation (β = .72, SE = .14, *p* <.001; 95% CI = .43, 1.00). Specifically, the effect of interactivity on evaluation was only significant for pleasant content (β = .32, SE = .15, *p* = .029; 95% CI = .03, .61), but not for unpleasant content (β = -.03, SE = .14, *p* = .83; 95% CI = -.31, .25).

Discussion

Study 2 demonstrates the robustness of the minimal-interactivity effect, such that those who used a single simple action to exercise control over the experience had faster thought speed and evaluated the experience more positively compared to those in the passive condition. It is worth noting that increased thought speed does not offset the negative effect of unpleasant content.

An interesting but unexpected effect that emerged was the effect of content valence on thought speed. Prior literature in thought speed has not made any formal predictions about the relationship between affect and thought speed. However, using the feelings-as-information hypothesis, Schwarz and Clore (1983) suggested that negative states tend to alert people to problematic situations and prompt them for problem solving. Because thought speed tends to accelerate in situations that increase cognitive demands, negative content could have prompted this increase in thinking speed.

Study 3

Study 3 has two main objectives: 1) to test multitasking (i.e., additional cognitive load) as a moderating factor, and 2) to move beyond evaluations to also examine the consequences of interactivity on *consumption* (hypothesis 1b). As predicted in hypothesis 3, multitasking should increase thought speed for those in the passive condition because more thoughts are occurring in the same period of time. That is, in addition to the media consumption experience, when participants engage in a second task that requires thinking (in the same period of time), thought speed should increase.

To test this prediction, I administered a cognitive-load task in which participants are asked to remember an eight-digit number or not. This task requires cognitive resources

(Block, Hancock and Zakay 2010), which I predict will increase thought speed for those in the passive condition. As discussed above, this effect is likely to be limited by consumers' working memory and attentional resources, as additional cognitive demands can elevate thought speed only insofar as resources are available to facilitate that increase (Kahneman 1973; Wickens 1980). Therefore, I predict a ceiling effect after which cognitive resources are fully allocated, and additional demands do not further increase thought speed (hypothesis 3). Finally, this study tests a new dependent measure: intention to subsequently consume a similar experience (hypothesis 1b).

Participants, Experimental Design and Procedure

A total of 125 undergraduate students (M_{age} = 21.2; 54% female) completed the study in a lab in exchange for partial course credit. They were randomly assigned to one of four conditions in a 2 (*interactivity*: interactive vs. passive) × 2 *(cognitive load*: load vs. no-load) between-subjects design. Participants in all conditions saw a series of 20 images in randomized order. Interactivity was manipulated as in the previous studies.

To maintain consistency between conditions, participants in both the cognitive-load and no-load conditions saw an eight-digit number. However, I only asked participants in the load condition to remember the eight digits and report the number back at the end of the survey (Etkin 2016; Shiv and Huber 2000). Participants in the no-load condition were simply instructed to type the full number into a box without trying to remember it. To ensure that memorizing and recalling a number correctly does not create a sense of accomplishment or achievement, which could impact consumers' preferences, participants were asked to report back the digits at the end of the study after all the key measures were taken.

After participants were shown the eight-digit number, they saw a series of 20 images as in Study 1A. Evaluation was measured with the same scale as in the prior studies (α = .76), and thought speed was measured using the Pronin and Wegner (2006) scale. To measure participants' consumption intention for a subsequent similar experience, I asked them to respond to the following on a seven-point Likert scale: "How willing are you to look through another set of images?" (1 = not at all willing, 7 = very willing to).

As a manipulation check, we asked participants to report their level of attention during the experience ("How much attention did you devote to remembering the digits given to you?"; 1 = none at all, 7 = a lot).

Results

Manipulation Checks. A one-way ANOVA revealed a main effect of cognitive load on attention, confirming a successful manipulation such that participants under cognitive load ($M = 4.08$, SD = 1.78) allocated more of their attention to remembering the number than did those who were not under load ($M = 3.67$, SD = 1.70; $F(1, 123) = 83.68$, $p < .001$, $\eta^2_p = .41$). Among participants in the cognitive-load condition, 85.9% correctly recalled all the numbers, 7.8% missed one digit, 1.6% missed more than 3 digits, and 4.7% recalled the correct digits but missed the correct order.

Thought Speed, Evaluation and Consumption Intention. To examine the effect of interactivity on thought speed, evaluation and consumption intentions, I ran a MANOVA with interactivity, cognitive load and their interactions as the independent variables and thought speed, evaluation and consumption intentions as the dependent variables.

As predicted by hypothesis 2, a significant main effect of interactivity on thought speed was observed ($F(1, 121) = 12.47$, $p < .001$, $\eta^2_p = .093$). Participants who viewed the images interactively had faster thought speed, regardless of whether they were under load or not ($M_{interactive} = 4.37$, SD = 1.55; $M_{passive} = 3.39$, SD = 1.81). There was also a directional main effect of cognitive load such that those under cognitive load reported faster thought speed (M_{load} = 4.08, SD = 1.78; $M_{no\text{-}load}$ = 3.67, SD = 1.70; $F(1, 121) = 3.09$, $p = .08$, η^2_p = .025). Importantly, the two-way MANOVA revealed a significant interaction between interactivity and cognitive load ($F(1, 121) = 4.41$, $p = .038$, $\eta^2_p = .035$). As predicted by hypothesis 3, cognitive load induced faster thought speed among participants in the passive condition (M_{load} = 3.89, SD = 1.89; $M_{no\text{-}load}$ = 2.74, SD = 1.51; $F(1, 121) = 7.35$, $p = .008$), but not among those in the interactive condition ($M_{no\text{-}load}$ = 4.41, SD = 1.48; M_{load} = 4.31, SD = 1.65; $F(1, 121) = .059$, $p = .81$). In other words, putting passive participants under cognitive load had a similar effect on thought speed as interactivity, which supports hypothesis 3 (Figure 6).

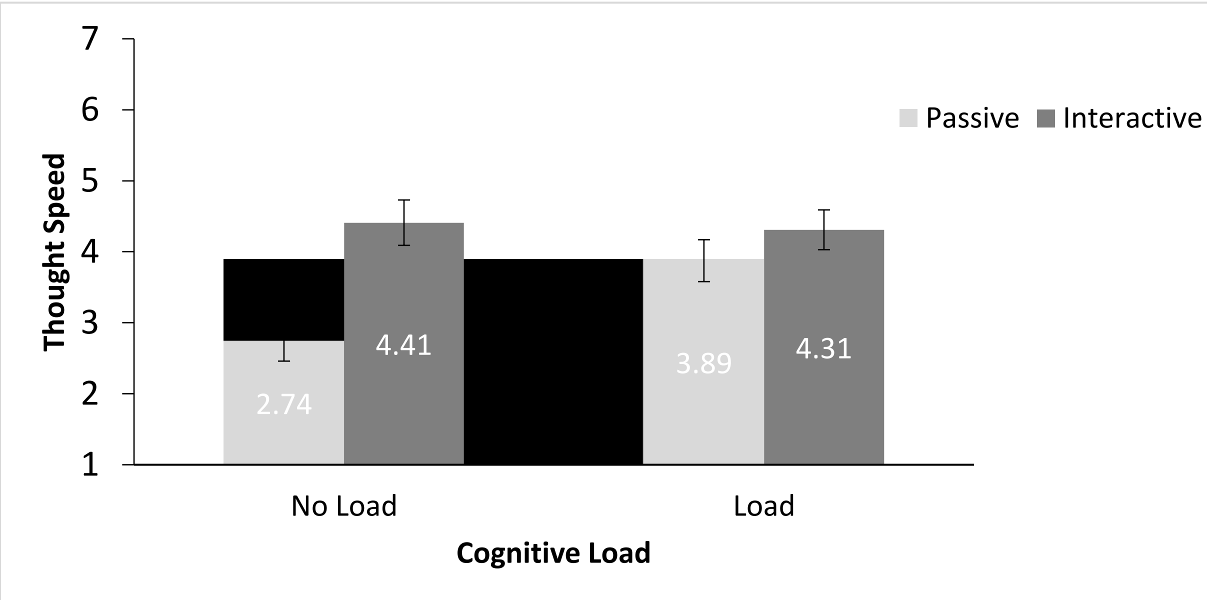
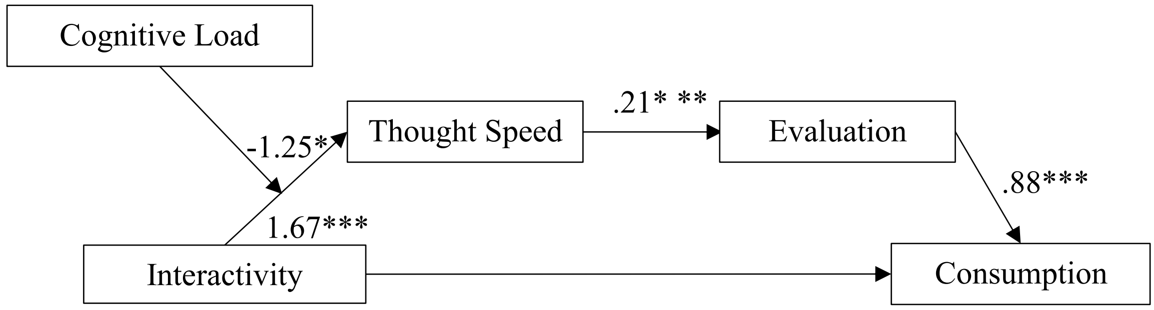


Figure 6 Effect of Minimal Interactivity x Cognitive Load on Thought Speed

Results revealed a significant main effect of interactivity on evaluation (hypothesis 1a). Compared to participants in the passive condition (M = 3.03, SD = 1.24), participants in the interactive condition evaluated the experience more positively (M = 3.53, SD = 1.16; $F(1, 121) = 5.89$, $p = .017$, $\eta^2_p = .046$). There was no main effect of cognitive load on evaluation (M_{load} = 3.38, SD = 1.28; $M_{no\text{-}load}$ = 3.18, SD = 1.16; $F(1, 121) = 1.41$, $p = .24$, $\eta^2_p = .012$), nor an interaction between cognitive load and interactivity on evaluation (F(1, 121) = .002, p = .96, η^2_p < .001).

Results revealed a significant main effect of interactivity on consumption intention (hypothesis 1b) such that exercising control over the content increased participants' intentions to view more images in the future ($M_{passive}$ = 3.74, SD = 1.95; $M_{interactive}$ = 4.51, SD = 1.82; F(1, 121) = 5.63, p = .019, η^2_p = .044). There was no main effect of cognitive load on consumption (M_{no_load} = 3.98, SD = 1.95; M_{load} = 4.27, SD = 1.89; F(1, 121) = 1.16, p = .28, η^2_p = .010), nor an interaction between cognitive load and interactivity on consumption (F(1, 121) = .08, p = .78, η^2_p = .001).

Mediation Analysis. This moderated mediation analysis tested hypothesis 3 and the serial-mediation model (illustrated in Figure 7), which predicts that interactivity increases consumption intention via a serial-mediation process of accelerated thought speed and enhanced evaluations, moderated by cognitive load. To test this full model, I used interactivity as the independent variable, consumption intention as the dependent variable, thought speed and evaluation as the mediators, and cognitive load as the moderator (PROCESS 83; bootstrap estimation 10,000 resamples; Hayes 2018). The moderated mediation revealed that the interaction between interactivity and cognitive load predicted thought speed (β = -1.25, SE = .59, p = .0378; 95% CI = -2.42, -.07), which influenced evaluation (β = .21, SE = .06, p <.001; 95% CI = .09, .33); and this enhanced evaluation, in turn, increased participants' intention to consume the experience in the future (β = .88, SE = .13, p < .001; 95% CI = .62, 1.13). In addition, interactivity had different effects on participants' thought speed, depending on whether or not they were multitasking. Specifically, the significant indirect effect of thought speed on evaluation was conditional on the no-load condition (β = .31, SE = .14; 95% CI = .09, .62), but was not significant in the load condition (β = .08, SE = .09; 95% CI = -.08, .30).



Direct effect: β = .25, SE = .29; 95% CI = -.34, .83
Indirect effect with cognitive load: β = .08, SE = .09; 95% CI = -.08, .30
Indirect effect without cognitive load: β = .31, SE = .14; 95% CI = .09, .62
* $p < .05$; ** $p < .01$; *** $p < .001$

Figure 7. Mediation Analysis for Study 3

Discussion

This study serves two purposes. First, it provides initial evidence of a positive effect of interactivity beyond evaluation and on consumption intentions (hypothesis 1b). The results indicate a serial path such that for those not under cognitive load, minimal interactivity accelerates thought speed (hypothesis 2), which subsequently boosts evaluations (hypothesis 5) and, ultimately, increases consumption intentions (hypothesis 6). Second, I test the role of thought speed via moderation by inducing additional cognitive load. Critically, the cognitive-load manipulation increased thought speed, but it did not enhance consumers' evaluations or consumption intentions. As in Study 1B, an increase in evaluations was only evident when faster thought speed was generated by interactivity—that is, using a single simple action that exercises control over the experience. Further, despite the pervasiveness of engaging in more than one activity while consuming digital content, the results from this study suggest that multitasking does not help enhance the evaluation and consumption intention of a digital experience.

Study 4

The goals for this study are 1) to examine the relationship between thought speed and arousal, and 2) to explore whether the effect of interactivity is also influenced by the arousal level of the digital content. While past research (Yang and Pronin 2008) suggested a link between thought speed and arousal, the directionality of this relationship was not studied. Therefore, I manipulated arousal level in this study in order to test whether there is a directionally significant causal relationship—such that high arousal does speed up people's thoughts.

Participants, Experimental Design and Procedure

A total of 173 participants (MTurk, M_{age} = 33.9; 56% female) were randomly assigned to one of four conditions in a 2 (*interactivity*: interactive vs. passive) × 2 (*arousal*: low vs. high) between-subjects design. Participants in all conditions read 20 unrelated sentences in randomized order. The only difference between the interactive and passive conditions is that participants in the active condition clicked on a button to move to the next sentence, while participants in the passive conditions were exposed to the sentences in a slideshow manner. Each sentence was presented to participants in the passive condition for 20 seconds before moving on to the next sentence. Arousal levels were manipulated using Affective Norms for English Text (ANET), which were previously validated to provide normative ratings of emotion for brief text excerpts in the English language (Bradley and Lang 2007). The arousal levels for the high arousal condition ranged from 6.62 to 8.54 and from 2.19 to 5.16 in the low arousal condition.

Evaluation was again measured as in previous studies, after participants read the short text excerpts (α = .64). To test the dimensionality of the scale, a principal-component analysis (PCA) was conducted. Only one factor emerged from the results of this PCA, and all items loaded onto a single factor (eigen value for one factor was 1.87 versus .96 for two factors). The Pronin and Wegner (2006) measure was again used to record thought acceleration. Following the same procedure as in the previous study, I asked participants to report on their attention level during the experience; and arousal level was measured by a single-item scale (0 = low arousal, 10 = high arousal).

Results

Manipulation Check. Participants in the high-arousal condition (M = 6.31, SD = 2.78) indeed reported greater arousal than participants in the low-arousal condition (M = 4.81, SD = 3.10; F(1, 171) = 11.31, p < .001).

Thought Speed. Once again, interactivity had a main effect on thought speed such that interacting with the digital content accelerated thought speed ($M_{\text{interactive}}$ = 4.67, SD = 1.50; M_{passive} = 3.90, SD = 1.80; F(1, 169) = 9.03, p = .003, η^2_p = .05). Although those in the high-arousal condition reported faster thought speed ($M_{\text{high-arousal}}$ = 4.51, SD = 1.56; $M_{\text{low-arousal}}$ = 4.05, SD = 1.81; F(1, 169) = 3.01, p = .085, η^2_p = .02), this did not reach conventional levels of statistical significance. There was no significant interaction between interactivity and arousal (F(1, 169) = .28, p = .596).

Evaluation. To test whether the effect of minimal interactivity on evaluation varies by arousal level, I examined the effects of interactivity, arousal, and their interactions on evaluation. First, as in the prior studies, participants in the interactive condition evaluated the experience significantly more positively than did those in the passive condition ($M_{\text{interactive}}$ = 4.99, SD = .969; M_{passive} = 4.41, SD = 1.28; F(1, 169) = 10.96, p = .001, η^2_p = .06). There was no main effect of arousal on evaluation ($M_{\text{high-arousal}}$ = 4.73, SD = 1.15; $M_{\text{low-arousal}}$ = 4.66, SD = 1.19; F(1, 169) = .093, p = .760, η^2_p = .001), nor an interaction between interactivity and arousal (F(1, 169) = .069, p = .793).

Consumption Intentions. Next, I examined the effects of minimal interactivity (vs. passive), arousal (high vs. low) and their interactions on consumption intentions. First, the results again reveal that participants in the interactive condition reported greater intention to consume the experience than did those in the passive condition ($M_{\text{interactive}}$ = 5.68, SD = 1.34; M_{passive} = 4.98, SD = 1.84; $F(1, 169) = 8.29$, $p = .004$, $\eta^2_p = .047$). Additionally, there was no main effect of arousal on evaluation ($M_{\text{high-arousal}}$ = 5.29, SD = 1.73; $M_{\text{low-arousal}}$ = 5.37, SD = 1.56; $F(1, 169) = .072$, $p = .788$) nor was there an interaction between interactivity and arousal ($F(1, 169) = 1.12$, $p = .292$).

Mediation Analyses. To assess the mediating role of thought speed, I ran a mediation model with interactivity as the independent variable, thought speed and evaluation as the mediators, and consumption intention as the dependent variable (PROCESS model 6; bootstrap estimation 10,000 resamples; Hayes 2013). As expected, interactivity increased thought speed (β = .77, SE = .25, $p = .0026$; 95% CI = .27, 1.23), which influenced evaluation (β = .36, SE = .04, $p < .001$; 95% CI = .28, .45); and this enhanced evaluation, in turn, increased participants' intention to consume the experience in the future (β = .50, SE = .12, $p < .001$; 95% CI = .27, .73). The indirect was significant (β = .14, SE = .07; 95% CI = .04, .30), while the direct effect was insignificant (β = .35, SE = .23; 95% CI = -.11, .81), indicating full mediation.

Discussion

The results from this study do not support the entrainment argument—specifically, an increase in arousal only increased thought speed directionally. Further, this shift in thought acceleration did not help to enhance the overall experience. However, the findings from this study do suggest that the effect of interactivity is not limited by the arousal level of the content: Regardless of whether the content was exciting or calming, a single simple action that exercised control over the experience led to higher evaluations and elevated intentions to further consume the digital experience.

So far, the results have consistently supported the minimal-interactivity effect; however, the model has not yet been tested in the context of a consequential consumption decision. Study 5 introduces an incentive-compatible choice to see if there is a meaningful difference between consumers' intentions and their actual behaviour in this domain (e.g. Hsee and Zhang 2004; Van Boven et al. 2012).

Study 5

The main objective of Study 5 is to replicate the effect of interactivity on consumption using a consequential choice task. In Stage 1 of this experiment, participants viewed 20 images interactively or passively, as in the previous studies. However, rather than simply asking participants to then self-report their intention to view more images, this time I allowed them to view as many (or as few) additional images as they liked (in Stage 2). The goal was to see how interactive or passive consumption in Stage 1 affects the consumption of interactive and passive media in Stage 2. The number of images that participants consumed (in addition to the 20 images they were originally assigned to view) served as the main dependent variable.

The focus of this study is on the two conditions in which participants remained in the same treatment across the two stages (i.e., interactive-interactive or passive-passive), which allow me to examine the extent to which interactivity (vs. passivity) in Stage 1 affects similar media consumption in the future (i.e., the number of images viewed in Stage 2). Based on prior theorizing and the results of the studies reported above, I expect that those initially assigned to interactive consumption will choose to consume more interactive images in the future, while those initially assigned to passive consumption will choose to consume fewer passive images in the future.

It is less clear what to expect when considering the conditions in which people are initially assigned to interactive (passive) consumption and then switch to passive (interactive) consumption. Although there are no strong predictions in these cases, they were included to allow for a full factorial design. This approach addresses the question: Will interactivity at any stage increase media consumption or does the effect only hold when the initial experience is interactive?

Participants, Experimental Design and Procedure

A total of 390 participants (MTurk; $M_{\text{age}} = 39.3$; 59% female) were randomly assigned to one of four conditions in a 2 (*Stage 1 interactivity*: interactive vs. passive) × 2 (*Stage 2 interactivity*: interactive vs. passive) between-subjects design.

In Stage 1, participants in all conditions saw a series of 20 images (in randomized order). Interactivity was manipulated as in the prior studies and, as above, I presented IAPS images of neutral valence and moderate arousal (Lang and Bradley 2007).

In Stage 2, all participants were asked to view as many additional images as they liked (again, the IAPS images were of neutral valence and moderate arousal; Lang and Bradley 2007). They were told that they could choose to quit viewing images at any point in time by clicking on a button indicating "I am done." Participants could view a maximum of 40 images and a minimum of 0 images in addition to the 20 images they saw in Stage 1.

In Stage 2, participants were again randomly assigned to either an interactive or a passive condition. As a result, the design of this experiment resulted in four distinct randomly assigned groups of participants: II (interactive in Stage 1 and interactive in Stage 2); PP (passive in Stage 1 and passive in Stage 2); IP (interactive in Stage 1 and passive in Stage 2); and PI (passive in Stage1 and interactive in Stage 2).

After participants indicated that they were finished with the viewing experience, the total number of images consumed in Stage 2 was recorded.

Results

The number of images consumed was a simple count with non-negative integer values; therefore, count models such as Poisson or a negative binomial are preferred over OLS models. I noted that the variance of consumption (103.79) was significantly higher than the mean (12.00). This over-dispersion violates the mean-variance equivalence assumption of Poisson models. Therefore, I used a series of negative binomial models to test the effect of interactivity on the actual number of images consumed.

A negative binomial distribution regression was run to predict the number of images that participants viewed in the consumption experience based on Stage 1 (interactive vs. passive) and Stage 2 (interactive vs. passive), as well as the interaction. I found *a main effect of interactivity in Stage 1*, such that those in the interactive (vs. passive) condition in Stage 1 consumed significantly more images in Stage 2 ($M_{\text{interactive-stage1}} = 13.28$, SE = .98; $M_{\text{passive-stage1}} = 10.69$, SE = .80; Wald(1, 386) = 4.56, $p = .033$). There was no main effect of interactivity at Stage 2 ($M_{\text{interactive-stage2}} = 11.00$, SE = .83; $M_{\text{passive-stage2}} = 12.78$, SE = .94; Wald(1, 386) = 2.01, $p = .16$), which indicates that whether media consumption was passive or interactive at Stage 2 did not influence the number of images consumed. There was also no significant interaction between the modes of image viewing across the two stages (Wald(3, 386) = 1.65, $p = .20$).

Planned contrasts revealed that participants in the II condition ($M = 13.37$, SE = 1.37) saw significantly more images than those in the PP condition ($M = 9.19$, SE = .98; $t(386) =$

4.18, $p = .013$). Furthermore, a "positive halo" of minimal interactivity emerges (Figure 8). In contrast to those in the PP condition, participants in conditions that included at least one exposure to interactivity consumed more images. Specifically, those in the IP condition (M = 13.18, SE = 1.41) consumed significantly more than those in the PP condition ($t(386) = 4.00$, $p = .02$). Those in the PI condition (M = 12.22, SE = 1.30) consumed more than those in the PP condition ($t(386) = 3.03$, $p = .06$), although this difference did not reach conventional levels of statistical significance. However, there were no significant differences between the II and IP conditions ($t(386) = .19$, $p = .92$), nor between the II and PI conditions ($t(386)$ = 1.15, $p = .54$).

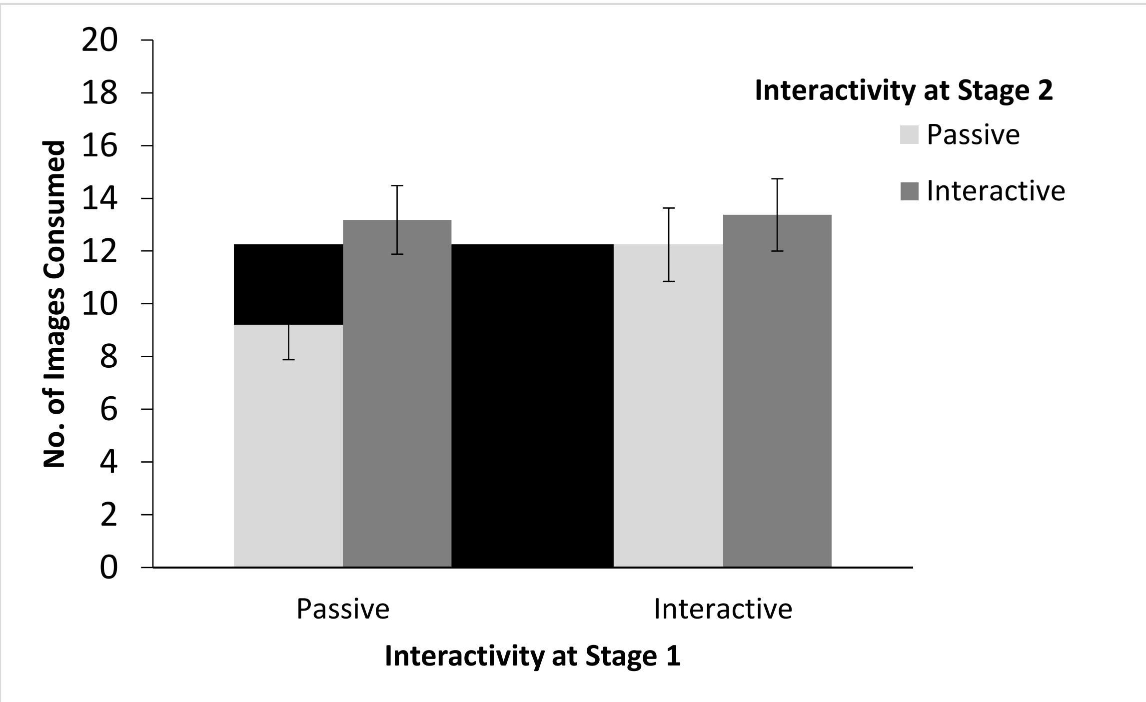


Figure 8. Effect of Minimal Interactivity on Actual Consumption

Discussion

Building on the last study, where participants were asked to self-report their preference for future consumption, I allowed participants in this study to voluntarily view more images and measured the actual number of images consumed. This is crucial, given that people often mis-predict how likely they are to carry out an action (Hsee and Zhang 2004; Van Boven et al. 2012). I demonstrate that this positive effect of minimal interactivity on digital experience is not restricted to evaluation and consumption intentions but also applies to real consumption behaviours. This study thus used a consequential choice task and again revealed a powerful effect of minimal interactivity on consumption. The focus in this experiment is on the two conditions in which participants remained in the same treatment across the two stages (II vs. PP). Notably, when consumers were free to choose in Stage 2, those in the II condition consumed 45.5% more images than those in the PP condition.

Second, in conditions in which people are initially assigned to interactive (passive) consumption and then switch to passive (interactive) consumption, the results from this study suggest a "positive halo" effect of minimal interactivity. Specifically, I found that the number of total images consumed is not significantly different as long as participants were in the interactive condition in at least one of the two stages.

Study 6

Prior research suggests that simple actions can be reinforcing (Hsee et al. 2015) and that people tend to prefer being active (Hsee et al. 2010). Therefore, it is possible that the effects observed in these studies were not due to minimal interactivity, but instead were simply the result of being active (rather than passive). In other words, it may be that any motor action will increase evaluations, and interactive behaviour is sufficient but not necessary. Thus, Study 6 aims to differentiate simple motor action from interaction. I argue that because minimal interactivity is defined as a single simple action that exercises control over the experience, it is the additional thought required to exercise that control that matters. Simple motor action without control will be insufficient.

This study also tests the possibility that the minimal-interactivity effect is being driven by a systematic bias in perceptions of how many images participants believe they saw across conditions. That is, depending on how many images participants believe they saw, they might feel like they used their time effectively and, as a result, evaluate the experience more positively. This, too, would mean that the critical effect is not about exercising control over the experience but is instead the result of an estimation bias. Study 6 rules out this alternative explanation. Although estimates of the numbers of images people report seeing do differ between conditions, these estimates do not explain the minimal-interactivity effect—that is, the effect of interactivity on evaluations and consumption is not mediated by image estimates.

Participants, Experimental Design and Procedure

A total of 284 participants (MTurk; M_{age} = 33.2; 55% female) were randomly assigned to one of three between-subjects conditions—interactive, active and passive.

The interactive and passive conditions were the same as in Studies 1A and 2. New to Study 6 is an active condition. In this condition, images were still shown in a slideshow manner (as in the passive condition); however, participants were instructed to view the images and to also click on a button at the bottom of the page to indicate that they saw the image. Moreover, to ensure that participants did not associate clicking on the button with advancing the page, they received explicit instructions that clicking on the button *will not* advance the page. Therefore, participants engaged in a simple motor action (clicking) in both the active and interactive conditions, but only in the interactive condition did clicking advance to a new image. This design allowed me to test the difference between interactivity, which is defined by a single simple action that exercises control over the experience, and simple motor actions that do not exercise such control.

As in the studies reported above, participants in all conditions saw a series of 20 images (in a randomized order) selected from the IAPS based on ratings of neutral valence and moderate arousal level (Lang and Bradley 2007). Participants were asked to evaluate their experience using the same four-item scale ($\alpha = .74$) and to rate their thought speed after viewing all the images. Additionally, participants indicated their intention to view more images.

Results

Thought Speed, Evaluation and Consumption. A MANOVA was used to compare participants' thought speed (hypothesis 2), evaluation (hypothesis 1a) and consumption of the experience (hypothesis 1b) among the three conditions. Once again, the results revealed a significant main effect of interactivity on thought speed ($F(2, 281) = 8.20$, $p < .001$, $\eta^2_p = .055$). Specifically, post-hoc analyses indicated a significant difference between the interactive ($M = 4.44$, SD = 1.45) and the passive conditions ($M = 3.63$, SD = 1.38; $t(281) = .81$, $p < .001$) and also between interactive and active conditions ($M = 4.00$, SD = 1.44; $t(281) = .44$, $p = .036$). Thought speed in the active condition was only directionally greater than in the passive condition ($t(281) = .37$, $p = .076$)—which is expected given that active participants engaged in a physical action.

As in the prior studies, a significant main effect of interactivity on evaluation emerged ($F(2, 281) = 3.70$, $p = .026$, $\eta^2_p = .026$). Post-hoc analyses revealed a significant difference between the interactive ($M = 4.09$, SD = 1.19) and passive conditions ($M = 3.64$, SD = 1.20) such that those in the interactive condition evaluated the experience more positively than did those in the passive condition ($t(281) = .44$, $p = .007$). No significant difference was found between the passive and active conditions ($M = 3.86$, SD = 1.03; $t(281) = .22$, $p = .20$). Finally, the interactive and active conditions were not significantly different from each other in this analysis ($t(281) = .23$, $p = .18$); however, differences did emerge when the full model was considered in the mediation analyses (see below).

Importantly, the results revealed a significant main effect of interactivity on consumption among conditions ($F(2, 281) = 5.07$, $p = .007$, $\eta^2_p = .035$). Post-hoc analyses across the three conditions indicated that participants in the interactive condition ($M = 5.76$, SD = 1.32) were significantly more likely to consume the experience again as compared to the active condition ($M = 5.08$, SD = 1.75; $t(281) = .68$, $p = .004$) and the passive condition ($M = 5.19$, SD = 1.67; $t(281) = .57$, $p = .012$). There was no significant difference between the passive and the active conditions ($t(281) = .11$, $p = .64$; see Figure 9), ruling out the possibility that the positive effect on consumption was caused by motor action alone.

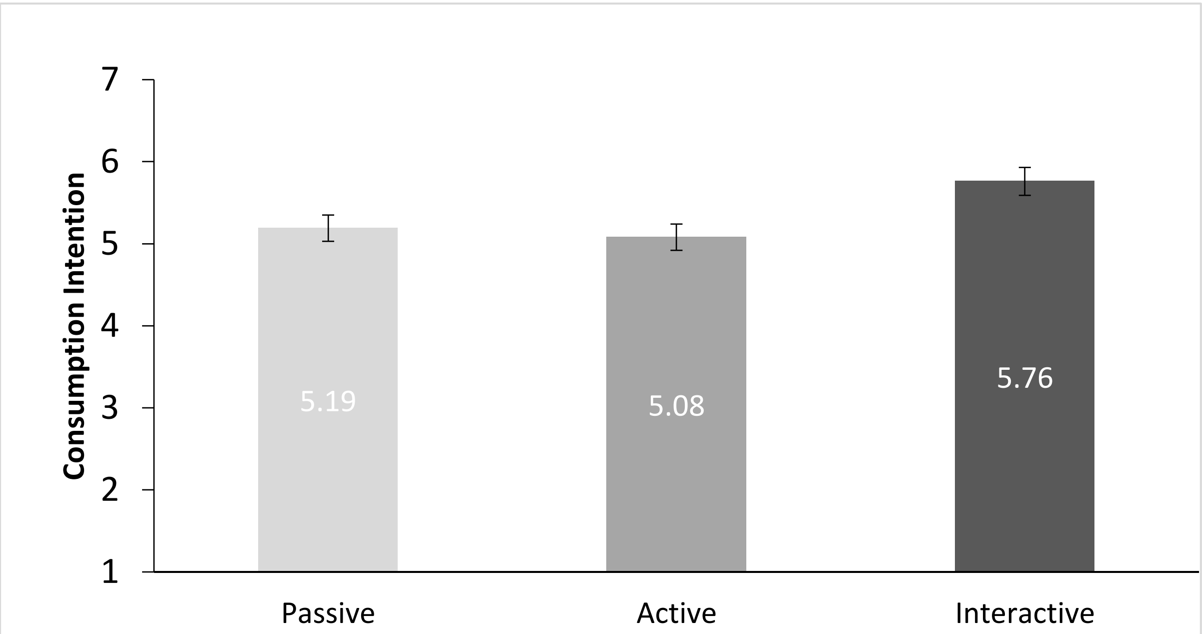


Figure 9. Effect of Interactivity on Consumption Intention

Mediation Analyses. I tested hypotheses 2, 5 and 6 again using a mediation model (PROCESS model 6; Hayes 2018) with 10,000 resamples. The independent variable was specified as a multi-categorical variable with interactivity as the reference group. As predicted, in contrast to the passive and active conditions, there was a significant serial-mediation effect from interactivity to thought speed to evaluation to consumption (β = -.10, SE = .04; 95% CI = -.18, -.04). However, as expected, the serial-mediation was not significant when comparing the active and passive conditions (β = .06, SE = .04; 95% CI = -.01, .13).

To contrast interactivity with the active and passive conditions separately, I then conducted two additional analyses by recoding the reference groups (Table 4). Both indirect effects for the serial mediation were significant ($\beta_{\text{passive-interactive}}$ = .13, SE = .04; 95% CI = .05, .22; $\beta_{\text{active-interactive}}$ = .07, SE = .04; 95% CI = .003, .15).

Table 4. Mediation Analyses for Study 6

		β	SE	LLCI	ULCI
Interactive vs. Passive and Active					
	Interactivity–Thought Speed	-.63	.18	-.97	-.28
	Thought Speed–Evaluation	.23	.05	.14	.33
	Evaluation–Consumption	.66	.08	.51	.81
	Indirect effect	-.10	.04	-.18	-.04
	Direct effect	-.46	.18	-.81	-.10
Passive vs. Interactive					
	Interactivity–Thought Speed	.81	.20	.42	1.21
	Thought Speed–Evaluation	.23	.05	.14	.33
	Evaluation–Consumption	.66	.08	.51	.81
	Indirect effect	.13	.04	.05	.22
	Direct effect	.34	.21	-.06	.75
Active vs. Interactive					
	Interactivity–Thought Speed	.44	.21	.03	.85
	Thought Speed–Evaluation	.23	.05	.14	.33
	Evaluation–Consumption	.66	.08	.51	.81
	Indirect effect	.07	.04	.003	.15
	Direct effect	.57	.21	.15	.98
Passive vs. Active					
	Interactivity–Thought Speed	.37	.21	-.04	.79
	Thought Speed–Evaluation	.23	.05	.14	.33
	Evaluation–Consumption	.66	.08	.51	.81
	Indirect effect	.06	.03	-.01	.13
	Direct effect	-.22	.21	-.63	.19

Note: Level of confidence for confidence intervals is 95%.
* Based on 10,000 bootstrap samples

Alternative Mechanism

As discussed above, one potential alternative explanation is that people in the different conditions under- or over-estimated the number of images that they consumed, and this biased their future consumption (Sackett et al. 2010). To test this possibility, participants in all conditions were asked to estimate the number of images they think they saw over the course of the experiment and report it. There was a significant difference in the numbers of images that participants estimated ($F(2, 281) = 3.36$, $p = .036$, $\eta^2_p = .023$). Those in the interactive condition significantly under-predicted in comparison to the passive condition ($M_{\text{interactive}} = 16.57$, SD = 5.30; $M_{\text{passive}} = 18.72$, SD = 6.42; $t(281) = 2.15$, $p = .013$), but they performed in a similar fashion as those in the active condition ($M_{\text{active}} = 17.12$, SD = 6.46; $t(281) = .55$, $p = .54$). Compared to those in the passive condition, those in the active condition also under-predicted the number of images they saw ($t(281) = .1.60$, $p = .075$), although this difference did not reach conventional levels of statistical significance. To test this as an alternative explanation, I used interactivity as the independent variable, consumption intention as the dependent variable, and participants' image estimates and evaluation as the mediators in a bootstrap estimation (PROCESS model 4; Hayes 2018) with 10,000 resamples. The indirect effects across conditions were not significant (see Table 5), indicating that estimates of image consumption do not explain the difference in participants' intentions to consume a similar experience in the future.

Table 5. Mediation Analyses for Alternative Explanation

	β	SE	LLCI	ULCI
Interactive vs. Passive and Active				
Interactivity–Estimation	1.35	.75	-.13	2.84
Estimation–Evaluation	-.02	.01	-.04	.004
Evaluation–Consumption	.64	.07	.50	.79
Indirect effect	-.02	.01	-.05	.004
Direct effect	-.45	.18	-.80	-.11
Passive vs. Interactive				
Interactivity–Estimation	-.55	.89	-2.31	1.21
Estimation–Evaluation	-.02	.01	-.04	.004
Evaluation–Consumption	.64	.07	.50	.79
Indirect effect	.01	.01	-.02	.04
Direct effect	.55	.21	.14	.96
Active vs. Interactive				
Interactivity–Estimation	-2.15	.86	-3.84	-.46
Estimation–Evaluation	-.02	.01	-.04	.004
Evaluation–Consumption	.64	.07	.50	.79
Indirect effect	.03	.02	-.003	.07
Direct effect	.37	.18	.02	.73
Passive vs. Active				
Interactivity–Estimation	-1.60	.90	-3.36	.16
Estimation–Evaluation	-.02	.01	-.04	.004
Evaluation–Consumption	.64	.07	.50	.79
Indirect effect	.02	.02	-.01	.06
Direct effect	-.20	.21	-.61	.22

Note: Level of confidence for confidence intervals is 95%.
* Based on 10,000 bootstrap samples

Discussion

The results of Study 6 do not support the notion that simple motor action is able to increase evaluations or consumption intentions. Study 6 does, however, once again replicate the minimal-interactivity effect. In support of hypotheses 1a, 1b, 2, 5 and 6, using a single simple action that exercises control over the digital experience increased thought speed, and this in turn enhanced evaluations and consumption intentions. This study also rules out another alternative explanation based on a consumption estimation bias. Although the number of images participants were asked to estimate differed slightly across conditions, it did not explain consumption intentions.

Interestingly, I did not find a difference in evaluation between those in the active versus interactive conditions. This is likely because clicking on a button gave participants an action to perform, which subtly enhanced their experience—some busyness is better than idleness (Hsee et al. 2010). However, because this simple motor action does not require the additional thought that exercising control does, there was not a significant increase in thought speed or media consumption intentions.

Studies 7A and B

As highlighted in Chapter 1, the sense of control is a universal need and drive for human behaviours. Thus, it is critical to test the possibility that the effect of minimal interactivity is driven by the lack of control in the passive conditions. Specifically, prior work shows that having personal control is a baseline state—people tend to maintain a perception of high personal control, even when control is absent (Alloy and Abramson 1979; Langer 1975). Thus, removing it in the passive condition could have caused negative reaction towards the experience. As a result, I test the possibility that limited control is dampening the effect, as opposed to minimal interactivity enhancing evaluations and consumption of the experience. To tease apart the difference, I manipulate the sense of control in two ways. In Study 7A, I directly manipulate the feelings of control associated with the experience. In Study 7B, I give participants an alternative task that influences their general sense of control.

Study 7A

Minimal interactivity is defined as a single simple action that exercises control over the experience. As such, it is different from a general sense of control that does not require performing the same simple actions during the experience. If the difference found between the passive and interactive conditions is driven by participants feeling a lack of control in the passive condition, then allowing them to exercise control should offset the negative effect of passivity. Conversely, if minimal interactivity enhances the experience, then feeling in control during a passive experience would not be sufficient to bolster participants' evaluations or consumption intentions.

Participants, Experimental Design and Procedure

A total of 201 undergraduates (M_{age} = 20.0; 53% female) were recruited to take part in the study in exchange for partial course credit and were randomly assigned to one of two conditions (*sense of control* vs. *interactivity*) in a between-subjects design. In the sense-of-control condition, participants were told that they would be viewing a series of images in a slideshow manner, and that they can choose how long to stay on each individual image. Participants were given three options to choose from (3 seconds, 5 seconds and 7 seconds). In the interactivity condition, participants were told that they will be viewing a series of images and that they can proceed to the next image by clicking on the "next" button. Participants were then shown a series of images, asked to evaluate the experience (α = .65) and rate how likely they are to participate in a similar experience.

Results

Choice of Options. For those in the passive condition, 28% (N = 28), 58% (N = 59), and 14% (N = 14) of the participants chose to spend 3, 5 and 7 seconds on the page per image, respectively. Among the three conditions, there were no significant differences in terms of perceived sense of control (p = .85), how engaging the experience was (p = .91) and evaluation (p = .52). However, there were no significant differences in how likely participants were to see another set of images (p = .09) and how much attention they paid to the experience (p = .07). For consumption intention, those who viewed the image for 3 seconds (*M* = 3.39, SE = .27) were more likely to view another set of images than those who viewed the image for 5 seconds (*M* = 2.68, SE = .19; *t*(98) = .72, *p* = .033). There were no significant differences between the 5-seconds and 7-seconds conditions (*M* = 3.14, SE = .39; *t*(98) = .47, *p* = .28), nor between the 3-seconds and 7-seconds conditions (*t*(98) = .25, *p* = .60). Moreover, those who viewed the image for 3 seconds (*M* = 3.68, SE = .26) paid more attention to the experience than those who viewed the image for 7 seconds (*M* = 2.64, SE = .36; *t*(98) = 1.04, *p* = .021). However, there were no significant differences between the 3-seconds and 5-seconds conditions (*M* = 3.24, SE = .18; *t*(98) = .44, *p* = .16), nor between the 5-seconds and 7-seconds conditions (*t*(98) = .59, *p* = .14).

Manipulation Check. Compared to the interactivity condition (*M* = 4.23, SD = 1.46), those who were asked to choose how long to stay on the page reported *greater* sense of control (*M* = 5.02, SD = 1.46; *F*(1, 199) = 14.65, *p* < .001). Hence, the manipulation of control was successful.

Evaluation and Consumption Intention. As in the previous studies, participants in the interactive condition evaluated the experience more positively (*M* = 3.69, SD = 1.09) compared to those in the passive conditions (*M* = 3.34, SD = 1.08; *F*(1, 199) = 5.07, *p* = .025)[1]. This difference was mainly driven by those in the 5-seconds-passive condition—those in the interactive condition evaluated the experience more positively than did those in the 5-seconds-passive (β = -.45, SE = .18, *p* = .013). However, there were no significant differences between the interactive condition and the 3-seconds-passive (β = -.19, SE = .23, *p* = .40), or 7-seconds-passive (β = -.20, SE = .31, *p* = .51) conditions.

Since the options participants chose influenced subsequent consumption intention, I ran a linear mixed-effects model with the condition (passive vs. interactive) as fixed-effects, and individual participants, and participants' choice of time spent on the images (3 seconds

[1] I also tested the data using a linear mixed-effects model. However, the estimate for the random effect returned 0, meaning that the slopes did not differ across individuals.

vs. 5 seconds vs. 7 seconds) as random effects. I chose this analysis based on the assumption that the individuals choosing the different options differed on an unobservable construct. A linear mixed-effects model was chosen over a general linear model because the experiment contains an unbalanced design—participants self-selected into the three different conditions, so the cell sizes across the passive conditions were not equal.

Minimal interactivity as a fixed-effect was not significantly different from the passive with choice conditions ($p = .14$). However, contrasting the interactive condition against the passive conditions showed that those in the interactive condition reported greater consumption intentions than did those in the 3-seconds-passive ($\beta = -.96$, SE = .33, $p = .004$), 5-seconds-passive ($\beta = -1.7$, SE = .25, $p < .001$), and 7-seconds-passive ($\beta = -1.2$, SE = .43, $p = .006$) conditions[2].

To ensure that average time spent on each image did not drive the effects, two linear regressions were run with the average time participants spent on viewing the images as the independent variable, and participants' evaluations and consumption intentions as the dependent variables. Average time was not a significant predictor for evaluation ($\beta = .062$, SE = .095, $t = .65$, $p = .52$) nor for participants' intentions to consume again ($\beta = .01$, SE = .14, $t = .069$, $p = .945$).

Study 7B

Past work has demonstrated that people are quite effective at using various means to restore the sense of control (Beck, Rahinel and Bleier 2020; Chen, Lee and Yap 2016; Cutright 2012). For example, control deprivation leads consumers to acquire more utilitarian products (Chen et al. 2016) and to choose brands that display brand leadership to restore the sense of self-control (Beck et al. 2020). Cutright (2012) found in a series of studies that when

[2] An ANOVA comparing the minimal interactivity condition with all passive conditions combined returned comparable results ($F(1, 199) = 42.77$, $p < .001$, $\eta^2_p = .18$).

faced with situations of low perceived control, consumers were more likely to choose options that are more structured to restore that sense of control. For example, participants in the studies were more likely to choose a logo design with a boundary (border) and a store layout that is more organized. If the main motivation for participants to positively evaluate an interactive experience is driven by a sense of control, participants should be more likely to indicate greater consumption intention for the interactive option after recalling a situation in which they had low control. This is because the interactive experience would help them to restore the sense of control. However, participants should not display any differences in preference when their perceived sense of control is high. In other words, if the positive effect of minimal interactivity is only driven by a sense of control, then I would expect to see an interaction effect between the sense of control and interactivity in terms of participants' consumption intention. Conversely, this interaction effect would not emerge if the effect is caused by taking a simple action that exercises control over the experience.

Participants, Experimental Design and Procedure

A total of 238 undergraduates (M_{age} = 19.9; 42% female) were randomly assigned to one of four conditions in a 2 (*interactivity*: interactive vs. passive) × 2 (*control*: high vs. low) between-subjects design. Participants were first asked to view 20 images either in a slideshow fashion or with the ability to click "next" to proceed. Then, to manipulate the sense of control that participants have, I asked them to take part in an autobiographical recall task (Chen, Lee and Yap 2016; Whitson and Galinsky 2008) in which they recalled and wrote a short paragraph about a personal incident. Participants in the low-control condition were asked to describe a situation in which they had no control, while participants in the high-control condition were asked to describe a situation in which they had complete control over it. An example of a low-control incident was waiting for public transportation, and an example of a high-control incident was studying for a difficult exam. Two items measuring how much control participants felt after the writing task were used as manipulation-check items ("I was in control of the situation."; "I had influence over what was happening."; 1 = strongly disagree, 7 = strongly agree; $\alpha = .89$). Following the writing task, participants were asked to reflect on their previous image-viewing experience and to rate the key dependent variable: "How willing are you to look through another set of images?" (1 = not at all willing, 7 = very willing to). Participants were asked two additional questions to ensure that the writing tasks did not differ in terms of perceived difficulty ("How difficult was the writing exercise?"; 1 = very easy, 7 = very difficult), and that participants invested the same amount of effort in them ("How much effort did you invest in the activity?"; 1 = no effort, 7 = a great deal of effort).

Results

Manipulation Check. Compared to the no-control condition ($M = 2.31$, SD = 1.52), those who were asked to write about a situation that they had complete control over ($M = 5.42$, SD = 1.25, $p < .001$) reported greater sense of control. This was not driven by whether or not participants were in the interactive condition ($p = .16$). Additionally, the two writing tasks did not differ in terms of perceived difficulty level ($p = .62$), nor how much effort participants put in ($p = .79$). Hence, the manipulation of control restoration was successful.

Consumption Intention. A one-way ANOVA was run with intention as the dependent variable and interactivity and the sense of control as the independent variables. Only a main effect of interactivity was observed such that those in the interactive condition ($M = 4.19$, SD = 1.87) were significantly more likely to see more pictures than were those in the passive condition ($M = 2.97$, SD = 1.71; $F(1, 234) = 27.31$, $p < .001$, $\eta^2_p = .11$). No main effect of control was observed ($M_{\text{control}} = 3.51$, SD = 1.93; $M_{\text{no-control}} = 3.66$, SD = 1.85; $F(1, 234)$

= .63, p = .629, η^2_p = .001). There was also no interaction effect between the two factors (F(1, 234) = 2.16, p = .143, η^2_p = .009).

Discussion

In these two studies, I compared the effect of minimal interactivity with the effect of control and found that a general sense of control is not sufficient to explain the effect of minimal interactivity. Specifically, by testing the effect of control through 1) giving participants control at the beginning, and 2) letting participants recall a situation in which they were in control, the positive effect of interactivity still persisted over those in the passive condition. Although having the ability to click “next” to proceed in the experience is a form of control, these results demonstrate that the findings cannot be explained by a general sense of control alone.

CHAPTER 3: GENERAL DISCUSSION

Interactive digital media have become a common part of the daily consumer experience. Reflecting that reality, I am interested in better understanding the factors that drive consumers to spend more than 6 hours a day interacting with digital media. Prior work has examined interactivity in the context of information processing and found a positive effect on product evaluation (e.g. Ariely 2000; Lombard and Snyder-Duch 2001; Schlosser 2003). Complementing this work, I investigate the effect of minimal interactivity on consumers' evaluations and, ultimately, consumption behaviour. Across a series of seven studies in two different consumption domains (reading and image viewing), I demonstrate a robust effect of minimal interactivity and explain the underlying psychological mechanism.

Studies 1A and 1B show that in both image viewing and reading, consumers evaluate a digital experience more positively when they interact with the content rather than passively consume it. These initial studies support my prediction that thought acceleration mediates this effect, while at the same time casting doubt on engagement, flow and affect as alternative explanations. Further, the pleasantness of the content is an important moderator, such that the positive effect of minimal interactivity is not sufficient to offset negative content (Study 2). I also identify multitasking as a novel moderator of thought speed; however, this thought acceleration does not directly translate into enhanced evaluation or consumption of the experience because it is extraneous to the experience (Study 3). Furthermore, although prior work has suggested a plausible link between arousal and thought speed, I do not find that increased arousal level accelerates thinking speed (Study 4). Finally, I demonstrate that this minimal-interactivity effect extends beyond evaluation to consumption through a serial-mediation process (Studies 3, 4 and 5). Finally, this minimal-interactivity effect cannot be attributed to simple motor actions or to an estimation bias (Study 6), and it is distinct from a general sense of control (Studies 7A and B).

Theoretical Contributions

This dissertation makes several theoretical contributions to the fields of marketing and consumer research:

First, it contributes broadly to our understanding of consumption in digital environments. Changes in technology have dramatically affected media consumption. Consumers now spend more than 6 hours per day interacting with digital media (e.g. social media), which exceeds the time spent with traditional, passive media (e.g. television; eMarketer 2018a). Yet little is known about what drives consumers' growing preference for interactive digital media. In a series of studies, I explain why (even minimal) interactivity can create a powerful advantage over passive media content.

Second, this work contributes to the interactivity literature by examining how even a *minimal* amount of interactivity influences consumption. The results of this dissertation extend earlier work in this area, which focused on the effect of interactivity on information processing and more complex and challenging tasks that require high levels of skill (Ariely 2000; Mathwick and Rigdon 2004; Schlosser 2003; Wu 2005). At the time that work was particularly impactful for understanding the initial use of the internet as a vast source of information. Since then the growth of social media and the ubiquity of mobile devices have made digital media consumption a daily experience for many consumers (Statista 2017), who often navigate online platforms at low levels of interactivity—for example, clicking from one Instagram image, Tweet or Facebook post to the next. This research demonstrates that such minimal interactivity can have a powerful effect on consumer behaviour—a few clicks of a mouse can increase media consumption by as much as 45% in a consequential choice task (Study 5).

Third, to explain the effect of minimal interactivity, I introduce a novel psychological mechanism to the marketing literature, demonstrating the role that thought speed can play in the consumption of digital experiences. In doing so, I contribute to the emerging literature on the effects of thought speed on behaviour (Chandler and Pronin 2012; Pronin and Jacobs 2008). This approach differs from prior work, which has relied on mechanisms that require greater involvement from the consumer, including engagement, and flow. In the context of minimal interactivity, I do not find support for these alternative explanations.

Importantly, the results of these studies do indicate that an increase in thought speed *alone* is not sufficient to enhance evaluations or increase consumption. Critical to the process is interactivity: consumers using a single simple action that exercises control over *the experience*. As expected, thought speed increased by behaviour not directly related to the experience—for example, random clicking or unrelated multitasking—does not translate into higher evaluations of the experience or greater consumption. Instead, the results indicate that the increase in thought speed needs to be driven by thoughts integral to the experience. When consumers think about and exercise control over the experience, the subsequent thought acceleration affects evaluations of the experience and consumption of similar experiences in the future.

Finally, this research contributes to the literature on productivity effects during hedonic consumption (Bellman and Murray 2018; Keinan and Kivetz 2010; Luo et al. 2013). In contrast to the extant literature, productivity in this paper is cognitive (i.e., more thought per unit of time) rather than behavioural (e.g. more points scored in a video game; Murray and Bellman 2011). This is related to the idea that consumers prefer to be active (Hsee et al. 2010), but in the case of minimal interactivity that sense of busyness comes from accelerated thought speed rather than physical activity or external accomplishments. Interestingly, this is true even though interactive participants (incorrectly) estimated that they saw fewer images than their passive counterparts (Study 6), which is evidence that a sense of cognitive productivity can affect consumption behaviour even when perceptions of actual activity are attenuated.

Practical Implications

Practically, this research speaks to the increasing trend of consumers spending large amounts of time interacting with digital media, which in 2018 exceeded time spent with traditional media and averaged over 6 hours per day (eMarketer 2018a). From 2011 to 2017, digital media consumption increased by 65% (from 214 minutes in 2011), in contrast with a decrease in traditional media consumption by 19% (from 453 minutes in 2011; Statista 2017). While some of this consumption is highly interactive, visceral and entertaining, the results of this dissertation explain how even when consumers interact with relatively mundane digital media at a minimal level of interactivity, they are likely to develop a strong preference for it over passive viewing.

Although the results from this dissertation support the notion that even minimal interactivity can enhance the experience, it is essential to note that good content matters. This is critical for managers to consider when implementing digital strategies because including interactive features have limitations and may not be a panacea. As I demonstrated in this dissertation, content serves as a boundary condition to minimal interactivity. In other words, the positive impact of minimal interactivity on an experience cannot offset negative affect elicited from unpleasant content. Thus, having good content that elicits positive emotions is the foundation to a pleasant consumption experience; adding interactive features can help boost that positive experience, but is insufficient to compensate for an unpleasant experience.

Another practical implication that stems from this research is that the inclusion of minimal interactivity in a digital experience does not have to be omnipresent to cover every aspect of the experience. As shown in Study 5, participants responded well to the experience regardless of when, and how much minimal interactivity was included in the experience. For some, consumption remained the same even when interactivity was first introduced but later removed. Thus, a single exposure to minimal interactivity may be sufficient to reach a desired outcome. By implementing strategies that include some, rather than all, interactive features, companies may be able to harness the benefit of interactivity without increasing expenditure. This can be especially helpful for smaller firms that lack the resources to launch an experience that is fully interactive.

Limitations and Future Research

In this dissertation, I have only included text and images in the study. Although by doing so I maintain a high level of internal validity, this paradigm simplifies the complexity of real-life consumption of digital content. Future studies could extend the current findings by including videos and sound clips. Additionally, participants in the studies saw either images or text. In reality, consumers often see a combination of images and text. For example, images often serve as illustrations to an article, and text often supplement an image in the forms of comments, titles, or descriptions. Future studies should examine the effect of combining text and images in one experience to enhance the ecological validity of this work. Finally, although I have included a consequential choice task to measure consumers' behaviour, it is worthwhile to conduct future fieldwork. For example, future studies could track consumers' real behaviours on a website in order to examine the effect of minimal interactivity on their consumption experience.

Another limitation of this work is that I focused on simple clicking actions as a form of minimal interactivity. However, there are other forms of simple actions that consumers can use to exercise control over an experience. For example, scrolling, tapping, or even shaking the device can be alternative forms of minimal interactivity. Interestingly, with the growing popularity of voice assistants (e.g. Google Home, Alexa, and Siri), simple voice commands such as saying "next" to Alexa can also be forms of minimal interactivity. One potential fruitful avenue of research is for future studies to explore the impact of other forms of minimal interactivity. For example, is it possible that one form of minimal interactivity would work better than others in certain situations? When might a particular form of minimal interactivity backfire in one situation but not in others? It seems possible that for content that is visual, perhaps a visually salient form of interaction (e.g. seeing and clicking on a button) is preferred over a voice-activated command, and vice versa.

Although in this research I examined *minimal* interactivity, interactivity can occur in many forms (Steur 1992). There is an opportunity for future research to build on the current findings to better understand minimal interactivity, as well as different types of interactivity. This includes interactivity that happens at a lower level, such as simply expressing preferences (e.g. "likes" and "upvotes"), and interactivity that are more complex. With rapid technological development, including virtual reality and voice-activated assistants, there are many opportunities to study varying degrees of interactivity and their impact on the consumption experience. For example, how much interactivity is too much in a given experience? As Spielmann and Mantonakis (2018) suggests, additional cognitive load can impede the positive effect of interactivity. However, it is less clear under what circumstances interactivity *itself* adds additional cognitive load. Perhaps the ability to interact with content can be seen as a distraction in some context.

Relatedly, when digital media consumption is taking up more than 6 hours a day, some of that activity is obviously occurring while consumers engage in other tasks. I find no advantage in evaluations of the target experience when consumers are engaged in an unrelated activity. It is possible, however, that if the multitasking is complementary to the target experience, it could have a positive effect. For example, Twitter has found that when consumers are passively watching television, multitasking in the form of tweeting can increase engagement with the TV program (Twitter 2014). Furthermore, jointly consuming television advertising and social media can also increase online word-of-mouth volume (Fossen and Schweidel 2016). More research on the interaction between separate but simultaneous media consumption activities is an interesting area for future research.

Finally, there is abundant room for further work in determining how mental speed influences other consumer relevant outcomes. In this dissertation, I focused on the evaluation and consumption of digital experiences. Future work should examine how changes in thought speed influence other consumer behaviours. For example, in the digital context, would consumers be more or less likely to share content when their thinking speed is fast (vs. slow)? It is possible, given the link between arousal and thought speed, that faster thinking speed would lead to greater sharing and dissemination of content. Another potential research direction is to examine the effect of thought speed on product choices. For example, could changes in thought speed influence consumers' likelihood to try a new product? On the one hand, thought acceleration increases action readiness, which could influence consumers to choose products that have been chosen in the past (Suri, Sheppes and Gross 2015) and decrease their likelihood to try a new product. In contrast, Chandler and Pronin (2012) have shown that thought acceleration induces greater risk taking, which could mean that consumers might be more willing to try something new. These questions and others remain to be answered in future research.

Overall, I provide insight into how a single simple action that exercises control over an experience influences how consumer evaluate and consume that experience. I find that compared to a passive consumption experience, minimal interactivity enhances the experience by increasing consumers' thought speed.

REFERENCES

Alba, J. W. and Williams, E. F. (2013). Pleasure Principles: A Review of Research on Hedonic Consumption. *Journal of Consumer Psychology*, *23*(1), 2-18.

Alloy, L. B. and Abramson, L. Y. (1979). Judgment of Contingency in Depressed and Nondepressed Students: Sadder but Wiser? *Journal of Experimental Psychology: General*, 108(4), 441.

Amiel, T. and Sargent, S. L. (2004). Individual Differences in Internet Usage Motives. *Computers in Human Behavior*, *20*(6), 711-726.

Andrade, E. B. (2005). Behavioral Consequences of Affect: Combining Evaluative and Regulatory Mechanisms. *Journal of Consumer Research*, *32*(3), 355-362.

Argo, J. J., Dahl, D. W., & Morales, A. C. (2006). Consumer Contamination: How Consumers React to Products Touched by Others. *Journal of Marketing*, 70(2), 81-94.

Ariely, D. (2000). Controlling the Information Flow: Effects on Consumers' Decision Making and Preferences. *Journal of Consumer Research*, *27*(2), 233-248.

Asghar, T., Akram, A., Ali, J. and Bahram, J. Q. (2014). Effect of Short-Term Caffeine Supplementation On Stress Response and Immune System of Male Athletes. *Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports*, (4), 74-79.

Bagozzi, R. P., Gopinath, M. and Nyer, P. U. (1999). The Role of Emotions In Marketing. *Journal of The Academy of Marketing Science*, 27(2), 184-206.

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of Social Behavior: Direct Effects of Trait Construct and Stereotype Activation on Action. *Journal of Personality and Social Psychology*, 71(2), 230.

Beck, J. T., Rahinel, R. and Bleier, A. (2020). Company Worth Keeping: Personal Control and Preferences for Brand Leaders. *Journal of Consumer Research*, 46(5), 871-886.

Bell, C. C. (1994). DSM-IV: Diagnostic and Statistical Manual of Mental Disorders. *Jama*, 272(10), 828-829.

Bellman, S. and Murray, K. B. (2018). Feedback, Task Performance, and Interface preferences. *European Journal of Information Systems*, *27*(6), 654-669.

Bettman, J. R., Johnson, E. J. and Payne, J. W. (1990). A Componential Analysis of Cognitive Effort in Choice. *Organizational Behavior and Human Decision Processes*, 45(1), 111-139.

Bergkvist, L. and Rossiter, J. R. (2007). The Predictive Validity of Multiple-Item Versus Single- Item Measures of The Same Constructs. *Journal of Marketing Research*, *44*(2), 175-184.

Bergmann, H. C., Rijpkema, M., Fernández, G. and Kessels, R. P. (2012). Distinct Neural Correlates of Associative Working Memory and Long-Term Memory Encoding in the Medial Temporal Lobe. *Neuroimage*, 63(2), 989-997.

Bloch, P. H., Brunel, F. F. and Arnold, T. J. (2003). Individual Differences in The Centrality of Visual Product Aesthetics: Concept and Measurement. *Journal of Consumer research*, *29*(4), 551-565.

Block, R. A., Hancock, P. A. and Zakay, D. (2010). How Cognitive Load Affects Duration Judgments: A Meta-Analytic Review. *Acta Psychologica*, *134*(3), 330-343.

Bradley, M. M. and Lang, P. J. (2007). Affective Norms for English Text (ANET): Affective Ratings of Text and Instruction Manual. *Techical Report. D-1, University of Florida, Gainesville, FL*.

Brasel, S. A. and Gips, J. (2014). Tablets, touchscreens, and touchpads: How varying touch interfaces trigger psychological ownership and endowment. *Journal of Consumer Psychology*, *24*(2), 226-233.

Carrier, L. M., Cheever, N. A., Rosen, L. D., Benitez, S. and Chang, J. (2009). Multitasking Across Generations: Multitasking Choices and Difficulty Ratings in Three Generations of Americans. *Computers in Human Behavior*, 25(2), 483-489.

Chandler, J. J. and Pronin, E. (2012). Fast Thought Speed Induces Risk Taking. *Psychological Science*, *23*(4), 370-374.

Chen, C. Y., Lee, L. and Yap, A. J. (2017). Control Deprivation Motivates Acquisition of Utilitarian Products. *Journal of Consumer Research*, 43(6), 1031-1047.

Chumbley, J. and Griffiths, M. (2006). Affect and The Computer Game Player: The Effect of Gender, Personality, and Game Reinforcement Structure on Affective Responses to Computer Game-Play. *CyberPsychology & Behavior*, *9*(3), 308-316.

Cohen, J. B., Pham, M. T. and Andrade, E. B. (2008). The Nature and Role of Affect in Consumer Judgment and Decision Making. In C. P. Haugtvedt, P. M. Herr, & F. R. Kardes (Eds.), *Handbook of Consumer Psychology*. Mahwah, NJ: Erlbaum.

Csikszentmihalyi, M. (1997). Finding Flow: The Psychology of Engagement with Everyday Life. Basic Books.

Cutright, K. M. (2012). The Beauty of Boundaries: When and Why We Seek Structure in Consumption. *Journal of Consumer Research*, 38(5), 775-790.

Di Muro, F. and Murray, K. B. (2012). An Arousal Regulation Explanation of Mood Effects on Consumer Choice. *Journal of Consumer Research*, *39*(3), 574-584.

Diehl, K., Zauberman, G. and Barasch, A. (2016). How Taking Photos Increases Enjoyment of Experiences. *Journal of Personality and Social Psychology*, *111*(2), 119.

Dijksterhuis, A. and Bargh, J. A. (2001). The Perception-Behavior Expressway: Automatic Effects of Social Perception on Social Behavior. In *Advances in Experimental Social Psychology* (Vol. 33, pp. 1-40). Academic Press.

Drolet, A. L. and Morrison, D. G. (2001). Do We Really Need Multiple-Item Measures in Service Research? *Journal of Service Research*, *3*(3), 196-204.

Duff, B. R. and Sar, S. (2015). Is There a Need for Speed? Fast Animation as Context Increases Product Trial Intent and Self-Focus. *International Journal of Advertising*, *34*(2), 262-284.

Eckart, C. and Bunzeck, N. (2013). Dopamine Modulates Processing Speed in The Human Mesolimbic System. Neuroimage, 66, 293-300.

eMarketer. (2018a, October 23). US Time Spent with Media 2018. Retrieved on March 12, 2019 from https://content-na1.emarketer.com/us-time-spent-with-media-2018

eMarketer. (2018b, April 19). Mobile Ad Spending to Surpass TV in 2018. Retrieved on March 12, 2019 from https://www.emarketer.com/content/mobile-advertising-is-expected-to-surpass-tv-ad-spending

Engeser, S. and Rheinberg, F. (2008). Flow, Performance and Moderators of Challenge-Skill Balance. *Motivation and Emotion*, *32*(3), 158-172.

Etkin, J. (2016). The Hidden Cost of Personal Quantification. *Journal of Consumer Research*, *42*(6), 967-984.

Ferguson, D. A. and Perse, E. M. (2000). The World Wide Web as a Functional Alternative to Television. *Journal of Broadcasting & Electronic Media*, *44*(2), 155-174.

Flavián-Blanco, C., Gurrea-Sarasa, R. and Orús-Sanclemente, C. (2011). Analyzing the Emotional Outcomes of The Online Search Behavior with Search Engines. *Computers in Human Behavior*, *27*(1), 540-551.

Fossen, B. L., & Schweidel, D. A. (2017). Television advertising and online word-of-mouth: An empirical investigation of social TV activity. *Marketing Science*, *36*(1), 105-123.

Galak, J., Kruger, J. and Loewenstein, G. (2013). Slow Down! Insensitivity to Rate of Consumption Leads to Avoidable Satiation. *Journal of Consumer Research*, 39(5), 993-1009.

Goldberg, M. E. and Gorn, G. J. (1987). Happy and Sad Tv Programs: How They Affect Reactions to Commercials. *Journal of Consumer Research*, 14(3), 387-403.

Grezes, J. and Decety, J. (2001). Functional Anatomy of Execution, Mental Simulation, Observation, and Verb Generation of Actions: A Meta-Analysis. *Human Brain Mapping*, 12(1), 1-19.

Häubl, G. and Murray, K. B. (2003). Preference Construction and Persistence in Digital Marketplaces: The Role of Electronic Recommendation Agents. *Journal of Consumer Psychology*, 13(1-2), 75-91.

Hargreaves, D., & Tiggemann, M. (2002). The Effect of Television Commercials on Mood and Body Dissatisfaction: The Role of Appearance-Schema Activation. *Journal of Social and Clinical Psychology*, 21(3), 287-308.

Havlena, W. J. and Holbrook, M. B. (1986). The Varieties of Consumption Experience: Comparing Two Typologies of Emotion in Consumer Behavior. *Journal of Consumer Research*, 13(3), 394-404.

Haws, K. L. and Poynor, C. (2008). Seize the Day! Encouraging Indulgence for the Hyperopic Consumer. *Journal of Consumer Research*, *35*(4), 680-691.

Hayes, A. F. (2013). Methodology in The Social Sciences. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. *New York, NY: Guilford Press.*

Hayes, A. F. (2018). Introduction to Mediation, Moderation, and Conditional Process Analysis Second Edition: A Regression-Based Approach. *New York, NY: The Guilford Press.*

Heilbronner, S. R. and Meck, W. H. (2014). Dissociations Between Interval Timing and Intertemporal Choice Following Administration of Fluoxetine, Cocaine, Or Methamphetamine. *Behavioural Processes*, 101, 123-134.

Higgins, E. T. (2006). Value from Hedonic Experience and Engagement. *Psychological Review*, *113*(3), 439.

Higgins, E. T. and Scholer, A. A. (2009). Engaging the Consumer: The Science and Art of the Value Creation Process. *Journal of Consumer Psychology*, *19*(2), 100-114.

Hoffman, D. L., and Novak, T. P. (1996). Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations. *Journal of Marketing*, *60*(3), 50–68. https://doi.org/10.2307/1251841

Holbrook, M. B. and Hirschman, E. C. (1982). The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun. *Journal of Consumer Research*, 9(2), 132-140.

Homer, B. D., Plass, J. L., & Blake, L. (2008). The Effects of Video On Cognitive Load and Social Presence In Multimedia-Learning. *Computers In Human Behavior*, 24(3), 786-797.

Hsee, C. K. and Zhang, J. (2004). Distinction Bias: Misprediction and Mischoice Due to Joint Evaluation. *Journal of Personality and Social Psychology*, *86*(5), 680.

Hsee, C. K., Yang, A. X. and Wang, L. (2010). Idleness Aversion and the Need for Justifiable Busyness. *Psychological Science*, *21*(7), 926-930.

Hsee, C. K., Yang, Y. and Ruan, B. (2015). The Mere-Reaction Effect: Even Nonpositive and Noninformative Reactions Can Reinforce Actions. *Journal of Consumer Research*, *42*(3), 420-434.

Husain, G., Thompson, W. F. and Schellenberg, E. G. (2002). Effects of Musical Tempo and Mode on Arousal, Mood, and Spatial Abilities. *Music Perception: An Interdisciplinary Journal*, *20*(2), 151-171.

IAB. (2017, May). The Changing TV Experience: 2017. Retrieved from https://www.iab.com/wp-content/uploads/2017/05/The-Changing-TV-Experience-2017.pdf

Isen, A. M. and Shalker, T. E. (1982). The Effect of Feeling State on Evaluation of Positive, Neutral, and Negative Stimuli: When You "Accentuate the Positive," Do You "Eliminate the Negative"? *Social Psychology Quarterly*.

James, W. (1890). *The Principles of Psychology.*

Jiang, Z., Chan, J., Tan, B. C. and Chua, W. S. (2010). Effects of Interactivity on Website Involvement and Purchase Intention. *Journal of the Association for Information Systems*, *11*(1), 34.

Jordan, P. W.(2000). Designing Pleasurable Products: An Introduction to the New Human Factors.

Kahneman, D. (1973). Attention and Effort (Vol. 1063). Englewood Cliffs, NJ: Prentice-Hall.

Kats, R. (2018, October 16). When Media Usage Overlaps. Retrieved from https://www.emarketer.com/content/when-media-usage-overlaps

Keinan, A. and Kivetz, R. (2010). Productivity Orientation and the Consumption of Collectable Experiences. *Journal of Consumer Research*, *37*(6), 935-950.

Khalfa, S., Roy, M., Rainville, P., Dalla Bella, S. and Peretz, I. (2008). Role of Tempo Entrainment in Psychophysiological Differentiation of Happy and Sad Music? *International Journal of Psychophysiology*, *68*(1), 17-26.

Kim, S., Chen, R. P. and Zhang, K. (2016). Anthropomorphized Helpers Undermine Autonomy and Enjoyment in Computer Games. Journal of Consumer Research, 43(2), 282-302.

Kiousis, S. (2002). Interactivity: A Concept Explication. *New Media and Society*, *4*(3), 355-383.

Klaaren, K. J., Hodges, S. D. and Wilson, T. D. (1994). The Role of Affective Expectations in Subjective Experience and Decision-Making. *Social Cognition*, 12(2), 77-101.

Ko, H., Cho, C.H., and Roberts, M. S. (2005). Internet Uses and Gratifications: A Structural Equation Model of Interactive Advertising. *Journal of Advertising*, *34*(2), 57–70. https://doi.org/10.1080/00913367.2005.10639191

Landau, M. J., Kay, A. C., & Whitson, J. A. (2015). Compensatory Control and the Appeal Of a Structured World. *Psychological Bulletin*, 141(3), 694.

Lang, P. and Bradley, M. M. (2007). The International Affective Picture System (IAPS) in the Study of Emotion and Attention. *Handbook of Emotion Elicitation and Assessment*, *29*.

Lang, P. J., Bradley, M. and Cuthbert, B. (2005). BM, 2005. *International Affective Picture System (IAPS): Affective Ratings of Pictures and Instruction Manual*. Technical Report A-6. University of Florida., Gainesville, Fl.

Langer, E. J. (1975). The Illusion of Control. *Journal of Personality and Social Psychology*, 32(2), 311.

Lefcourt, H. M. (1973). The Function of the Illusions of Control and Freedom. *American Psychologist*, 28(5), 417.

Lerner, J. S., Li, Y., Valdesolo, P. and Kassam, K. S. (2015). Emotion and Decision Making. *Annual Review of Psychology*, *66*.

Lombard, M., and Snyder-Duch, J. (2001). Interactive Advertising and Presence: A Framework. *Journal of Interactive Advertising*, *1*(2), 56-65.

Luo, L., Ratchford, B. T. and Yang, B. (2013). Why We Do What We Do: A Model of Activity Consumption. *Journal of Marketing Research*, *50*(1), 24-43.

Madzharov, A. V. (2019). Self-Control and Touch: When Does Direct Versus Indirect Touch Increase Hedonic Evaluations and Consumption of Food. *Journal of Retailing*, 95(4), 170-185.

Mano, H. and Oliver, R. L. (1993). Assessing the Dimensionality and Structure of the Consumption Experience: Evaluation, Feeling, and Satisfaction. *Journal of Consumer Research*, *20*(3), 451-466.

Mathwick, C. and Rigdon, E. (2004). Play, Flow, and the Online Search Experience. *Journal of Consumer Research*, *31*(2), 324–332. https://doi.org/10.1086/422111

McMillan, S. J. and Hwang, J. S. (2002). Measures of Perceived Interactivity: An Exploration of the Role of Direction of Communication, User Control, and Time in Shaping Perceptions of Interactivity. *Journal of Advertising*, *31*(3), 29-42.

McNair, C. (2018, May 4). Global Ad Spending. Retrieved from https://www.emarketer.com/content/global-ad-spending

Miklowitz, D. J. and Johnson, S. L. (2006). The Psychopathology and Treatment of Bipolar Disorder. *Annu. Rev. Clin. Psychol.*, *2*, 199-235.

Miniard, P. W., Bhatla, S., & Sirdeshmukh, D. (1992). Mood as a Determinant of Postconsumption Product Evaluations: Mood Effects and Their Dependency on the Affective Intensity of The Consumption Experience. *Journal of Consumer Psychology*, 1(2), 173-195.

Mollen, A. and Wilson, H. (2010). Engagement, Telepresence and Interactivity in Online Consumer Experience: Reconciling Scholastic and Managerial Perspectives. *Journal of Business Research*, *63*(9-10), 919-925.

Murray, K. B. and Bellman, S. (2011). Productive Play Time: The Effect of Practice on Consumer Demand for Hedonic Experiences. *Journal of the Academy of Marketing Science*, *39*(3), 376–391. https://doi.org/10.1007/s11747-010-0205-6

Mussweiler, T. (2006). Doing is for Thinking! Stereotype Activation by Stereotypic Movements. *Psychological Science*, *17*(1), 17-21.

Norman, D. A. (2004). *Emotional Design: Why We Love (or Hate) Everyday Things*. Basic Civitas Books.

Noseworthy, T. J. and Trudel, R. (2011). Looks Interesting, But What Does It Do? Evaluation of Incongruent Product Form Depends on Positioning. *Journal of Marketing Research*, *48*(6), 1008-1019.

Novak, T. P., Hoffman, D. L. and Duhachek, A. (2003). The Influence of Goal-Directed and Experiential Activities on Online Flow Experiences. *Journal of Consumer Psychology*, *13*(1-2), 3-16.

Novak, T. P., Hoffman, D. L. and Yung, Y.-F. (2000). Measuring the Customer Experience in Online Environments: A Structural Modeling Approach. *Marketing Science*, *19*(1), 22–42. https://doi.org/10.1287/mksc.19.1.22.15184

Noyes Jr, R. and Kletti, R. (1972). The Experience of Dying From Falls. *Omega-Journal of Death and Dying*, 3(1), 45-52.

Patrick, V. M. (2016). Everyday consumer aesthetics. *Current Opinion in Psychology*, *10*, 60-64.

Peace, V., Miles, L. and Johnston, L. (2006). It Doesn't Matter What You Wear: The Impact of Posed and Genuine Expressions of Happiness on Product Evaluation. *Social Cognition*, *24*(2), 137-168.

Peck, J. and Shu, S. B. (2009). The Effect of Mere Touch on Perceived Ownership. *Journal of Consumer Research*, 36(3), 434-447.

Péran, P., Démonet, J. F., Cherubini, A., Carbebat, D., Caltagirone, C. and Sabatini, U. (2010). Mental Representations of Action: The Neural Correlates of The Verbal and Motor Components. *Brain Research*, 1328, 89-103.

Pham, M. T., Cohen, J. B., Pracejus, J. W. and Hughes, G. D. (2001). Affect Monitoring and the Primacy of Feelings in Judgment. *Journal of Consumer Research*, *28*(2), 167-188.

Pronin, E. (2013). When the Mind Races: Effects of Thought Speed on Feeling and Action. *Current Directions in Psychological Science*, *22*(4), 283–288. https://doi.org/10.1177/0963721413482324

Pronin, E. and Jacobs, E. (2008). Thought Speed, Mood, and the Experience of Mental Motion. *Perspectives on Psychological Science*, *3*(6), 461-485.

Pronin, E. and Wegner, D. M. (2006). Manic Thinking: Independent Effects of Thought Speed and Thought Content on Mood. *Psychological Science*, *17*(9), 807–813.

Pronin, E., Jacobs, E. and Wegner, D. M. (2008). Psychological Effects of Thought Acceleration. *Emotion*, *8*(5), 597.

Puccinelli, N. M., Wilcox, K. and Grewal, D. (2015). Consumers' Response to Commercials: When the Energy Level in the Commercial Conflicts with the Media Context. *Journal of Marketing*, *79*(2), 1-18.

Richardson, M. J., Marsh, K. L., Isenhower, R. W., Goodman, J. R. and Schmidt, R. C. (2007). Rocking Together: Dynamics of Intentional and Unintentional Interpersonal Coordination. *Human Movement Science*, 26(6), 867-891.

Roberts, S. (1981). Isolation of an Internal Clock. *Journal of Experimental Psychology: Animal Behavior Processes*, 7(3), 242-268.

Rokeby, D. (1998). The construction of experience: Interface as content. *Digital Illusion: Entertaining the future with high technology*, *27*, 47.

Rosser, B. A. and Wright, K. A. (2016). The Impact of Thought Speed and Variability On Psychological State and Threat Perception: Further Exploration of The Theory of Mental Motion. *Cognitive Therapy and Research*, 40(4), 453-467.

Sackett, A. M., Meyvis, T., Nelson, L. D., Converse, B. A. and Sackett, A. L. (2010). You're Having Fun When Time Flies: The Hedonic Consequences of Subjective Time Progression. *Psychological Science*, *21*(1), 111–117.

Sana, F., Weston, T. and Cepeda, N. J. (2013). Laptop Multitasking Hinders Classroom Learning For Both Users and Nearby Peers. *Computers & Education*, 62, 24-31.

Sanbonmatsu, D. M., Strayer, D. L., Medeiros-Ward, N. and Watson, J. M. (2013). Who Multi-Tasks and Why? Multi-Tasking Ability, Perceived Multi-Tasking Ability, Impulsivity, and Sensation Seeking. *Plos One*, 8(1), E54402.

Schack, T., & Ritter, H. (2009). The Cognitive Nature of Action—Functional Links Between Cognitive Psychology, Movement Science, and Robotics. *Progress In Brain Research*, 174, 231-250.

Schlosser, A. E. (2003). Experiencing Products in the Virtual World: The Role of Goal and Imagery in Influencing Attitudes versus Purchase Intentions. *Journal of Consumer Research*, *30*(2), 184–198. https://doi.org/10.1086/376807

Schneiderman, B. (1987). Designing the User Interface: Strategies for Effective Human—Computer Interaction. Reading, MA: Addison-Wesley.

Schwarz, N. and Clore, G. L. (2003). Mood as Information: 20 Years Later. *Psychological Inquiry*, 14(3-4), 296-303.

Shiv, B. and Huber, J. (2000). The Impact of Anticipating Satisfaction on Consumer Choice. *Journal of Consumer Research*, *27*(2), 202-216.

Skinner, B. F. (1953). *Science and Human Behavior*. Simon and Schuster.

Skinner, E. A., Chapman, M. and Baltes, P. B. (1988). Control, Means-Ends, and Agency Beliefs: A New Conceptualization and Its Measurement During Childhood. *Journal of Personality and Social Psychology*, 54(1), 117.

Smit, H. J. and Rogers, P. J. (2000). Effects of Low Doses of Caffeine on Cognitive Performance, Mood and Thirst In Low and Higher Caffeine Consumers. *Psychopharmacology*, 152(2), 167-173.

Smith, T. S., Isaak, M. I., Senette, C. G., & Abadie, B. G. (2011). Effects of Cell-Phone and Text-Message Distractions on True and False Recognition. *Cyberpsychology, Behavior, and Social Networking*, 14(6), 351-358.

Song, J. H. and Zinkhan, G. M. (2008). Determinants of Perceived Web Site Interactivity. *Journal of Marketing*, *72*(2), 99-113.

Spielmann, N. and Mantonakis, A. (2018). In Virtuo: How User-Driven Interactivity in Virtual Tours Leads to Attitude Change. *Journal Of Business Research*, 88, 255-264.

Statista. (2017). Time Spent Per Day with Digital Versus Traditional Media in the United States from 2011 to 2017 (in Minutes). Retrieved on March 18, 2019 from www. statista.com

Stayman, D. M., Alden, D. L. and Smith, K. H. (1992). Some Effects of Schematic Processing on Consumer Expectations and Disconfirmation Judgments. *Journal of Consumer Research*, *19*(2), 240-255.

Steuer, J. (1992) Defining Virtual Reality: Dimensions Determining Telepresence. *Journal of Communication,* 42(4), 73-93.

Suri, G., Sheppes, G. and Gross, J. J. (2015). The Role of Action Readiness in Motivated Behavior. *Journal of Experimental Psychology: General*, 144(6), 1105.

Szalma, J. L. and Hancock, P. A. (2008). Task Loading and Stress in Human–Computer Interaction: Theoretical Frameworks and Mitigation Strategies. *Human-Computer Interaction*, 91.

Thaler, R. H. and Sunstein, C. R. (2009). *Nudge: Improving Decisions About Health, Wealth, and Happiness.* Penguin.

Thaut, M. H. (2015). The Discovery of Human Auditory–Motor Entrainment and Its Role in The Development of Neurologic Music Therapy. *In Progress in Brain Research* (Vol. 217, Pp. 253-266). Elsevier.

Thornton, B., Faires, A., Robbins, M. and Rollins, E. (2014). The Mere Presence of a Cell Phone May Be Distracting. *Social Psychology*.

Trochidis, K. and Bigand, E. (2013). Investigation of the Effect of Mode and Tempo on Emotional Responses to Music Using EEG Power Asymmetry. *Journal of Psychophysiology*.

Tullett, A. M., Kay, A. C. and Inzlicht, M. (2015). Randomness Increases Self-Reported Anxiety and Neurophysiological Correlates of Performance Monitoring. *Social Cognitive and Affective Neuroscience*, 10(5), 628-635.

Twitter (2014). Study: Exposure to TV Tweets Drives Consumers to Take Action – Both on and Off of Twitter. Retrieved on March 20, 2019 from https://blog.twitter.com/en_us/a/2014/study-exposure-to-tv-tweets-drives-consumers-to-take-action-both-on-and-off-of-twitter.html

Van Boven, L., Loewenstein, G., Welch, E. and Dunning, D. (2012). The Illusion of Courage in Self-Predictions: Mispredicting One's Own Behavior in Embarrassing Situations. *Journal of Behavioral Decision Making*, *25*(1), 1-12.

Van Noort, G., Voorveld, H. A. and Van Reijmersdal, E. A. (2012). Interactivity in Brand Web Sites: Cognitive, Affective, and Behavioral Responses Explained by Consumers' Online Flow Experience. *Journal of Interactive Marketing*, *26*(4), 223-234.

Ward, A. F., Duke, K., Gneezy, A. and Bos, M. W. (2017). Brain Drain: The Mere Presence of One’s Own Smartphone Reduces Available Cognitive Capacity. *Journal of The Association for Consumer Research*, 2(2), 140-154.

Watson, D., Clark, L. A. and Tellegen, A. (1988). Development and Validation of Brief Measures of Positive and Negative Affect: the PANAS Scales. *Journal of Personality and Social Psychology*, *54*(6), 1063.

Webster, J. and Ahuja, J. S. (2006). Enhancing the Design of Web Navigation Systems: The Influence of User Disorientation on Engagement and Performance. *MIS Quarterly*, 661-678.

White, R. W. (1959). Motivation Reconsidered: The Concept of Competence. *Psychological Review*, 66(5), 297.

White, T. L., Lott, D. C. and De Wit, H. (2006). Personality and The Subjective Effects of Acute Amphetamine in Healthy Volunteers. *Neuropsychopharmacology*, 31(5), 1064-1074.

Whitson, J. A. and Galinsky, A. D. (2008). Lacking Control Increases Illusory Pattern Perception. *Science*, 322(5898), 115-117.

Wickens, C. D. (1980). The Structure of Attentional Resources. *Attention and Performance VIII*, *8*, 239-257.

Wu, G. (2005). The Mediating Role of Perceived Interactivity in the Effect of Actual Interactivity on Attitude Toward the Website. *Journal of Interactive Advertising*, *5*(2), 29–39. https://doi.org/10.1080/15252019.2005.10722099

Yang, K. and Pronin, E. (2018). Consequences of Thought Speed. In *Advances in Experimental Social Psychology* (Vol. 57, pp. 167-222). Academic Press.

Yeomans, M. R., Ripley, T., Davies, L. H., Rusted, J. and Rogers, P. J. (2002). Effects of Caffeine on Performance and Mood Depend on The Level of Caffeine Abstinence. *Psychopharmacology*, 164(3), 241-249.

Zajonc, R. B. (1968). Attitudinal Effects of Mere Exposure. *Journal of Personality and Social Psychology*, 9(2P2), 1.

Zanna, M. P., Kiesler, C. A. and Pilkonis, P. A. (1970). Positive and Negative Attitudinal Affect Established by Classical Conditioning. *Journal of Personality and Social Psychology*, *14*(4), 321.

Zeithaml, V. A., Parasuraman, A. and Malhotra, A. (2002). Service Quality Delivery Through Web Sites: A Critical Review of Extant Knowledge. *Journal of the Academy of Marketing Science*, *30*(4), 362-375.

Zillmann, D. (2003). Theory of Affective Dynamics: Emotions and Moods. In J. Bryant, D. Roskos-Ewoldsen and J. Cantor (Eds.), *Lea's Communication Series*. *Communication and Emotion: Essays In Honor of Dolf Zillmann (P. 533–567).* Lawrence Erlbaum Associates Publishers

APPENDIX

Table 1 Descriptive Statistics for All Stimuli Used in Study 1B

Headline No.	*N*	Exciting *Mean*	Exciting *SD*	Boring *Mean*	Boring *SD*	Positive *Mean*	Positive *SD*	Negative *Mean*	Negative *SD*
1	32	4.38	1.5	4.09	1.55	3.75	1.32	4.38	1.5
2	32	4.84	1.37	3.91	1.59	3.38	1.56	4.84	1.37
3	32	4	1.67	4.31	1.57	4.06	1.95	4	1.67
4	32	4.53	1.5	3.72	1.51	3.66	1.31	4.53	1.5
5	32	4.41	1.72	4.34	1.33	3.75	1.7	4.41	1.72
6	32	3.84	1.72	3.91	1.49	4.22	1.48	3.84	1.72
7	32	4.06	1.93	3.81	1.77	3.75	1.85	4.06	1.93
8	32	4.22	1.56	4.25	1.67	3.69	1.75	4.22	1.56
9	32	4.53	1.59	4.5	1.59	3.53	1.5	4.53	1.59
10	32	4	1.52	4.25	1.61	4.53	1.37	4	1.52
11	32	4.97	1.56	4.41	1.7	3.13	1.54	4.97	1.56
12	32	3.91	1.49	4.28	1.55	4.09	1.23	3.91	1.49
13	32	4.38	1.74	3.69	1.89	3.75	1.81	4.38	1.74
14	32	4.34	1.58	4.41	1.52	3.91	1.59	4.34	1.58
15	32	4.44	1.74	4.13	1.74	3.63	1.62	4.44	1.74
16	32	4.94	1.72	4.06	1.98	3.66	1.72	4.94	1.72
17	32	4.41	1.58	3.91	1.91	3.69	1.71	4.41	1.58
18	32	4.13	1.5	4.16	1.67	4.06	1.32	4.13	1.5
19	32	4.38	1.34	3.88	1.56	3.88	1.36	4.38	1.34
20	32	4.5	1.52	3.75	1.87	3.53	1.32	4.5	1.52

Stimuli Used in Study 1B

Political Risk on Wall Street? Buy the Dip!

An abrupt stock selloff on Friday, sparked by a report that magnified concerns about President Donald Trump's potential links with Russia, prompted Wall Street's favorite reaction in recent months: "Buy the dip."

Samsung to Chase Big M&A Deals on Three Fronts,

Says Strategy Chief Samsung Electronics' $8 billion purchase of automotive and audio electronics company Harman has given the technology conglomerate confidence to chase more big deals, its strategy chief said on Friday.

'We Just Waited for Our Moment to Be Killed'

Few countries suffered as deeply as Cambodia over the last half-century. The tiny, beautiful Southeast Asian land was a battleground among the great powers and the scene of hugely destructive American bombing during the Vietnam War.

Giving the Globe A Networked Skin

IN the 20th century, scientists at Bell Laboratories invented modern marvels like the transistor and the laser, but that is ancient history to the engineers working there today for Lucent Technologies Inc.

Chief Justice's Annual Report Notes Progress in the Judiciary

Chief Justice William H. Rehnquist surveyed the state of the federal judiciary today and, in contrast to many of his 13 previous year-end reports, pronounced himself quite pleased.

Works In Progress From All Over; Eliot's Sly Revenge Against a Darwinist

The century's turn has been a time of retrospectives: what was the most important event, who was the most influential thinker? Arts & Ideas decided to take a look ahead at what some of today's researchers are working on.

Earthquake Strikes Off Kermadec Islands,No Tsunami Warning

An earthquake of magnitude 6.0 struck off the Kermadec Islands at a depth of 10 km on Monday, the Pacific Tsunami Warning Center said. There was no tsunami warning.

Exclusive: Exxon Eyes Egypt's Offshore Oil and Gas-Sources

Exxon Mobil is considering a foray into Egypt offshore oil and gas, seeking to replicate rivals' success in the country and boost its reserves, officials and industry sources said.

Facebook Opens New London HQ, to Create 800 UK Jobs

Facebook opens its new London office on Monday and said it would add 800 more jobs in the capital next year, underlining its commitment to Britain as the country prepares for Brexit.

In a Deadly Obsession, Food Is the Enemy

Experts estimate that 30 million Americans are plagued at some point in their lives by eating disorders. Some will recover; one-third will remain chronically ill or die.

China's A.I. Advances Help Its Tech Industry, and State Security

Global car brands and Chinese authorities alike embrace iFlyTek's voice recognition know-how, illustrating the dystopian possibilities behind the technology.

In South Korea, the Virtual Currency Boom Hits Home

Bitcoin and other virtual currencies are booming around the world. In South Korea, regular investors are leading the way for the global frenzy.

'Tis the Season: Woman Gets Help With Brother's Special Gift

A toy company and strangers are pitching in to help a Maryland woman find a particularly important Christmas gift for her disabled brother.

Vikings Shut Down Falcons 14-9 for 8th Straight Victory

The Vikings frustrated Matt Ryan, blanketed Julio Jones and kept the Atlanta Falcons out of the end zone.

Airbus's Bregier Sees 2017 Aircraft Deliveries Topping 700

Airbus planemaking chief Fabrice Bregier said the company still expects to deliver more than 700 aircraft to customers in 2017

Resident Questions Woman's Claim of Poisoning Neighbors

A Vermont senior living facility resident says she doesn't believe a woman tested a deadly toxin on neighbors.

How a Company Actually Plans to Spend Its Tax Cut Money

Republicans say their proposals will set off a wave of investment, hiring and raises. But the outlook from the executive suite is not so clear.

Lawyer for Egypt's Ex-Premier Meets Him at Cairo Hotel: Facebook Statement

Former Egyptian prime minister Ahmed Shafik's lawyer said on Sunday she had met with him at a hotel in Cairo, her first contact with him since his arrival in Cairo on Saturday.

Late City Victories 'Show What We Are' Says Guardiola

Manchester City's third successive late victory "shows what we are", manager Pep Guardiola said after David Silva's 83rd-minute winner saw his side equal a Premier League-record 13th successive triumph.

Argentina Checking Another Deep-Water Object in Sub Search

Argentina's navy says it's trying to make a visual inspection of another object that registered on a sonar search for remains of a submarine that vanished 18 days ago with 44 crew members aboard.

Table 2 Correlation Matrix

	Study 1a	Study 1b	Study 2	Study 3	Study 4	Study 5	Study 6	Study 7a	Study 7b
Thought Speed & Evaluation	.28**	0.48**	.11*	.34**	.56**	NA	.32**	NA	NA
Evaluation & Consumption	NA	NA	NA	.56**	.43**	NA	.47**	.52**	NA
Thought Speed & Consumption	NA	NA	NA	.28**	.31**	NA	0.09	NA	NA
Thought Speed & Average Time Spent (for interactivity condition)	-0.11	-0.1	-0.08	-0.15	-0.15	NA	-0.12	NA	NA

* p < .05; ** p < .01; *** p < .001